DV Qualfiers in database - HR

checked by [illegible] 2/24/17

CETIFICATION

SDG No:	FA40755	Laboratory:	Accutest, Florida
Site:	BMSMC, Humacao, PR	Matrix:	Soil

SUMMARY: Soil samples (Table 1) were collected on the BMSMC facility. The BMSMC facility is located in Humacao, PR. Samples were taken January 25-26, 2017 and were analyzed in Accutest Laboratory of Orlando, Florida that reported the data under SDG No.: FA40755. Results were validated using the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The data sample organic data samples summary form shows for analytes results that were qualified.

In summary the results are valid and can be used for decision taking purposes.

Table 1. Samples analyzed and analysis performed

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	ANALYSIS PERFORMED
FA40755-1	BKGSS-1	Soil	VOA Special List; VPH; EPH
FA40755-2	BKGSS-2	Soil	VOA Special List; VPH; EPH
FA40755-3	BKGSS-2 DUP	Soil	VOA Special List ; VPH; EPH
FA40755-4	BKGSS-3	Soil	VOA Special List ; VPH; EPH
FA40755-4D	BKGSS-3 MSD	Soil	VOA Special List ; VPH; EPH
FA40755-4S	BKGSS-3 MS	Soil	VOA Special List ; VPH; EPH
FA40755-5	FB-012517	AQ – Field Blank Soil	VOA Special List ; VPH; EPH
FA40755-6	FB-012617	AQ – Field Blank Soil	EPH

Reviewer Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante

Date: February 17, 2017

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$1.00 $1.00 1617179

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Report of Analysis

Client Sample ID:	BKGSS-1		
Lab Sample ID:	FA40755-1	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	87.1
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y33439.D	1	01/30/17	EP	n/a	n/a	VY1327
Run #2 [a]	Y33445.D	1	01/30/17	EP	n/a	n/a	VY1327

	Initial Weight	Final Volume
Run #1	5.08 g	5.0 ml
Run #2	5.57 g	5.0 ml

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	57	11	ug/kg	
71-43-2	Benzene	ND	5.7	1.4	ug/kg	
100-44-7	Benzyl Chloride	ND	5.7	1.4	ug/kg	
74-97-5	Bromochloromethane	ND	5.7	1.7	ug/kg	
75-27-4	Bromodichloromethane	ND	5.7	1.1	ug/kg	
75-25-2	Bromoform	ND	5.7	1.1	ug/kg	
78-93-3	2-Butanone (MEK)	ND	28	8.2	ug/kg	
104-51-8	n-Butylbenzene	ND	5.7	1.1	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.7	1.1	ug/kg	
75-15-0	Carbon Disulfide	ND	5.7	1.1	ug/kg	
56-23-5	Carbon Tetrachloride	ND	5.7	1.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.7	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.7	2.3	ug/kg	
67-66-3	Chloroform	ND	5.7	1.5	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.7	1.1	ug/kg	
110-82-7	Cyclohexane	ND	5.7	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.7	1.1	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.7	2.2	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.7	1.1	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.7	2.3	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	5.7	1.1	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	5.7	1.1	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	5.7	1.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.7	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.7	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.7	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.7	1.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.7	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.7	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.7	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.7	1.1	ug/kg	
123-91-1	1,4-Dioxane	ND	230	45	ug/kg	

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ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-1		
Lab Sample ID:	FA40755-1	**Date Sampled:**	01/26/17
Matrix:	SO - Soil	**Date Received:**	01/27/17
Method:	SW846 8260C	**Percent Solids:**	87.1
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	5.7	1.1	ug/kg	
76-13-1	Freon 113	ND	5.7	1.5	ug/kg	
591-78-6	2-Hexanone	ND	28	8.5	ug/kg	
98-82-8	Isopropylbenzene	ND	5.7	1.1	ug/kg	
79-20-9	Methyl Acetate	ND	28	10	ug/kg	
74-83-9	Methyl Bromide	ND	5.7	2.3	ug/kg	
74-87-3	Methyl Chloride	ND	5.7	2.3	ug/kg	
108-87-2	Methylcyclohexane	ND	5.7	1.9	ug/kg	
75-09-2	Methylene Chloride	ND	11	4.5	ug/kg	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	28	8.5	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.7	1.1	ug/kg	
103-65-1	n-Propylbenzene	ND	5.7	1.1	ug/kg	
100-42-5	Styrene	ND	5.7	1.1	ug/kg	
75-85-4	Tert-Amyl Alcohol	ND	57	15	ug/kg	
75-65-0	Tert-Butyl Alcohol	ND	57	20	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.7	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.7	1.4	ug/kg	
109-99-9	Tetrahydrofuran	ND	11	2.9	ug/kg	
108-88-3	Toluene	ND	5.7	1.1	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.7	1.6	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.7	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.7	1.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.7	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.7	1.1	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.7	2.3	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.7	1.1	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.7	1.1	ug/kg	
75-01-4	Vinyl Chloride	ND	5.7	1.1	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.7	1.1	ug/kg	
1330-20-7	Xylene (total)	ND	17	2.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%	109%	75-124%
17060-07-0	1,2-Dichloroethane-D4	116%	118%	72-135%
2037-26-5	Toluene-D8	113%	112%	75-126%
460-00-4	4-Bromofluorobenzene	126%	123%	71-133%

(a) Confirmation run for internal standard areas.

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J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	BKGSS-1		
Lab Sample ID:	FA40755-1	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP VPH REV 1.1	Percent Solids:	87.1
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UV077771.D	1	02/01/17	AJC	n/a	n/a	GUV4135
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.04 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	5600	2000	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	5600	2000	ug/kg	
	C9- C10 Aromatics (Unadj.)	ND	5600	2000	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	105%		70-130%
460-00-4	BFB	100%		70-130%

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J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-1		
Lab Sample ID:	FA40755-1	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3546	Percent Solids:	87.1
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017364.D	1	02/08/17	MG	02/01/17	OP63645	GNN877
Run #2							

	Initial Weight	Final Volume
Run #1	19.8 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	25300	12000	8700	ug/kg	
	C9-C18 Aliphatics	ND	12000	5800	ug/kg	
	C19-C36 Aliphatics	ND	12000	5800	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	61%		40-140%
580-13-2	2-Bromonaphthalene	86%		40-140%
84-15-1	o-Terphenyl	69%		40-140%
321-60-8	2-Fluorobiphenyl	92%		40-140%

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RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2		
Lab Sample ID:	FA40755-2	**Date Sampled:**	01/26/17
Matrix:	SO - Soil	**Date Received:**	01/27/17
Method:	SW846 8260C	**Percent Solids:**	78.4
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y33440.D	1	01/30/17	EP	n/a	n/a	VY1327
Run #2							

	Initial Weight	Final Volume
Run #1	4.90 g	5.0 ml
Run #2		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	65	13	ug/kg	
71-43-2	Benzene	ND	6.5	1.6	ug/kg	
100-44-7	Benzyl Chloride	ND	6.5	1.7	ug/kg	
74-97-5	Bromochloromethane	ND	6.5	1.9	ug/kg	
75-27-4	Bromodichloromethane	ND	6.5	1.3	ug/kg	
75-25-2	Bromoform	ND	6.5	1.3	ug/kg	
78-93-3	2-Butanone (MEK)	ND	33	9.5	ug/kg	
104-51-8	n-Butylbenzene	ND	6.5	1.3	ug/kg	
135-98-8	sec-Butylbenzene	ND	6.5	1.3	ug/kg	
75-15-0	Carbon Disulfide	ND	6.5	1.3	ug/kg	
56-23-5	Carbon Tetrachloride	ND	6.5	1.3	ug/kg	
108-90-7	Chlorobenzene	ND	6.5	1.3	ug/kg	
75-00-3	Chloroethane	ND	6.5	2.6	ug/kg	
67-66-3	Chloroform	ND	6.5	1.7	ug/kg	
95-49-8	o-Chlorotoluene	ND	6.5	1.3	ug/kg	
110-82-7	Cyclohexane	ND	6.5	1.6	ug/kg	
124-48-1	Dibromochloromethane	ND	6.5	1.3	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	6.5	2.5	ug/kg	
106-93-4	1,2-Dibromoethane	ND	6.5	1.3	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	6.5	2.6	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	6.5	1.3	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	6.5	1.3	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	6.5	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.5	2.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.5	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.5	1.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.5	1.8	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.5	1.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.5	1.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.5	1.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.5	1.3	ug/kg	
123-91-1	1,4-Dioxane	ND	260	52	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-2		
Lab Sample ID:	FA40755-2	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	78.4
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	6.5	1.3	ug/kg	
76-13-1	Freon 113	ND	6.5	1.7	ug/kg	
591-78-6	2-Hexanone	ND	33	9.8	ug/kg	
98-82-8	Isopropylbenzene	ND	6.5	1.3	ug/kg	
79-20-9	Methyl Acetate	ND	33	12	ug/kg	
74-83-9	Methyl Bromide	ND	6.5	2.6	ug/kg	
74-87-3	Methyl Chloride	ND	6.5	2.6	ug/kg	
108-87-2	Methylcyclohexane	ND	6.5	2.2	ug/kg	
75-09-2	Methylene Chloride	ND	13	5.2	ug/kg	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	33	9.8	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	6.5	1.3	ug/kg	
103-65-1	n-Propylbenzene	ND	6.5	1.3	ug/kg	
100-42-5	Styrene	ND	6.5	1.3	ug/kg	
75-85-4	Tert-Amyl Alcohol	ND	65	17	ug/kg	
75-65-0	Tert-Butyl Alcohol	ND	65	23	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.5	1.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.5	1.7	ug/kg	
109-99-9	Tetrahydrofuran	ND	13	3.3	ug/kg	
108-88-3	Toluene	ND	6.5	1.3	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	6.5	1.8	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	6.5	1.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.5	1.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.5	1.3	ug/kg	
79-01-6	Trichloroethylene	ND	6.5	1.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	6.5	2.6	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	6.5	1.3	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	6.5	1.3	ug/kg	
75-01-4	Vinyl Chloride	ND	6.5	1.3	ug/kg	
	m,p-Xylene	ND	13	1.4	ug/kg	
95-47-6	o-Xylene	ND	6.5	1.3	ug/kg	
1330-20-7	Xylene (total)	ND	20	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		75-124%
17060-07-0	1,2-Dichloroethane-D4	115%		72-135%
2037-26-5	Toluene-D8	108%		75-126%
460-00-4	4-Bromofluorobenzene	128%		71-133%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2		
Lab Sample ID:	FA40755-2	**Date Sampled:**	01/26/17
Matrix:	SO - Soil	**Date Received:**	01/27/17
Method:	MADEP VPH REV 1.1	**Percent Solids:**	78.4
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UV077772.D	1	02/01/17	AJC	n/a	n/a	GUV4135
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.73 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	8300	2900	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	8300	2900	ug/kg	
	C9- C10 Aromatics (Unadj.)	ND	8300	2900	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	105%		70-130%
460-00-4	BFB	101%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2		
Lab Sample ID:	FA40755-2	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3546	Percent Solids:	78.4
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017367.D	1	02/08/17	MG	02/01/17	OP63645	GNN877
Run #2							

	Initial Weight	Final Volume
Run #1	19.8 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	13000	9700	ug/kg	
	C9-C18 Aliphatics	ND	13000	6400	ug/kg	
	C19-C36 Aliphatics	ND	13000	6400	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	54%		40-140%
580-13-2	2-Bromonaphthalene	77%		40-140%
84-15-1	o-Terphenyl	64%		40-140%
321-60-8	2-Fluorobiphenyl	83%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: Y33441.D Y33446.D

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2 DUP		
Lab Sample ID:	FA40755-3	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	77.9
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y33441.D	1	01/30/17	EP	n/a	n/a	VY1327
Run #2 [a]	Y33446.D	1	01/30/17	EP	n/a	n/a	VY1327

	Initial Weight	Final Volume
Run #1	4.07 g	5.0 ml
Run #2	4.39 g	5.0 ml

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	79	16	ug/kg	
71-43-2	Benzene	ND	7.9	1.9	ug/kg	
100-44-7	Benzyl Chloride	ND	7.9	2.0	ug/kg	
74-97-5	Bromochloromethane	ND	7.9	2.3	ug/kg	
75-27-4	Bromodichloromethane	ND	7.9	1.6	ug/kg	
75-25-2	Bromoform	ND	7.9	1.6	ug/kg	
78-93-3	2-Butanone (MEK)	ND	39	11	ug/kg	
104-51-8	n-Butylbenzene	ND	7.9	1.6	ug/kg	
135-98-8	sec-Butylbenzene	ND	7.9	1.6	ug/kg	
75-15-0	Carbon Disulfide	ND	7.9	1.6	ug/kg	
56-23-5	Carbon Tetrachloride	ND	7.9	1.6	ug/kg	
108-90-7	Chlorobenzene	ND	7.9	1.6	ug/kg	
75-00-3	Chloroethane	ND	7.9	3.2	ug/kg	
67-66-3	Chloroform	ND	7.9	2.1	ug/kg	
95-49-8	o-Chlorotoluene	ND	7.9	1.6	ug/kg	
110-82-7	Cyclohexane	ND	7.9	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	7.9	1.6	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	7.9	3.0	ug/kg	
106-93-4	1,2-Dibromoethane	ND	7.9	1.6	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	7.9	3.2	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	7.9	1.6	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	7.9	1.6	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	7.9	1.8	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.9	2.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.9	1.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.9	1.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.9	2.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.9	1.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.9	1.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.9	1.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.9	1.6	ug/kg	
123-91-1	1,4-Dioxane	ND	320	63	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-2 DUP		
Lab Sample ID:	FA40755-3	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	77.9
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	7.9	1.6	ug/kg	
76-13-1	Freon 113	ND	7.9	2.1	ug/kg	
591-78-6	2-Hexanone	ND	39	12	ug/kg	
98-82-8	Isopropylbenzene	ND	7.9	1.6	ug/kg	
79-20-9	Methyl Acetate	ND	39	14	ug/kg	
74-83-9	Methyl Bromide	ND	7.9	3.2	ug/kg	
74-87-3	Methyl Chloride	ND	7.9	3.2	ug/kg	
108-87-2	Methylcyclohexane	ND	7.9	2.7	ug/kg	
75-09-2	Methylene Chloride	ND	16	6.3	ug/kg	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	39	12	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	7.9	1.6	ug/kg	
103-65-1	n-Propylbenzene	ND	7.9	1.6	ug/kg	
100-42-5	Styrene	ND	7.9	1.6	ug/kg	
75-85-4	Tert-Amyl Alcohol	ND	79	21	ug/kg	
75-65-0	Tert-Butyl Alcohol	ND	79	28	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.9	1.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.9	2.0	ug/kg	
109-99-9	Tetrahydrofuran	ND	16	4.1	ug/kg	
108-88-3	Toluene	ND	7.9	1.6	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	7.9	2.2	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	7.9	1.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.9	1.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.9	1.6	ug/kg	
79-01-6	Trichloroethylene	ND	7.9	1.6	ug/kg	
75-69-4	Trichlorofluoromethane	ND	7.9	3.2	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	7.9	1.6	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	7.9	1.6	ug/kg	
75-01-4	Vinyl Chloride	ND	7.9	1.6	ug/kg	
	m,p-Xylene	ND	16	1.7	ug/kg	
95-47-6	o-Xylene	ND	7.9	1.6	ug/kg	
1330-20-7	Xylene (total)	ND	24	3.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%	112%	75-124%
17060-07-0	1,2-Dichloroethane-D4	114%	118%	72-135%
2037-26-5	Toluene-D8	112%	131% [b]	75-126%
460-00-4	4-Bromofluorobenzene	139% [b]	125%	71-133%

(a) Confirmation run for surrogate recoveries.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-2 DUP		
Lab Sample ID:	FA40755-3	**Date Sampled:**	01/26/17
Matrix:	SO - Soil	**Date Received:**	01/27/17
Method:	SW846 8260C	**Percent Solids:**	77.9
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(b) Outside control limits due to matrix interference.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: UV077773.D

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2 DUP		
Lab Sample ID:	FA40755-3	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP VPH REV 1.1	Percent Solids:	77.9
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UV077773.D	1	02/01/17	AJC	n/a	n/a	GUV4135
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.18 g	15.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	25000	8600	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	25000	8600	ug/kg	
	C9- C10 Aromatics (Unadj.)	ND	25000	8600	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	106%		70-130%
460-00-4	BFB	100%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: NN017368.D

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-2 DUP		
Lab Sample ID:	FA40755-3	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3546	Percent Solids:	77.9
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017368.D	1	02/08/17	MG	02/01/17	OP63645	GNN877
Run #2							

	Initial Weight	Final Volume
Run #1	20.7 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	12000	9300	ug/kg	
	C9-C18 Aliphatics	ND	12000	6200	ug/kg	
	C19-C36 Aliphatics	ND	12000	6200	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	57%		40-140%
580-13-2	2-Bromonaphthalene	87%		40-140%
84-15-1	o-Terphenyl	66%		40-140%
321-60-8	2-Fluorobiphenyl	94%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-3		
Lab Sample ID:	FA40755-4	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	86.2
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y33442.D	1	01/30/17	EP	n/a	n/a	VY1327
Run #2 [a]	Y33447.D	1	01/30/17	EP	n/a	n/a	VY1327

	Initial Weight	Final Volume
Run #1	4.34 g	5.0 ml
Run #2	3.94 g	5.0 ml

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	67	13	ug/kg	
71-43-2	Benzene	ND	6.7	1.6	ug/kg	
100-44-7	Benzyl Chloride	ND	6.7	1.7	ug/kg	
74-97-5	Bromochloromethane	ND	6.7	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	6.7	1.3	ug/kg	
75-25-2	Bromoform	ND	6.7	1.3	ug/kg	
78-93-3	2-Butanone (MEK)	ND	33	9.7	ug/kg	
104-51-8	n-Butylbenzene	ND	6.7	1.3	ug/kg	
135-98-8	sec-Butylbenzene	ND	6.7	1.3	ug/kg	
75-15-0	Carbon Disulfide	ND	6.7	1.3	ug/kg	
56-23-5	Carbon Tetrachloride	ND	6.7	1.4	ug/kg	
108-90-7	Chlorobenzene	ND	6.7	1.3	ug/kg	
75-00-3	Chloroethane	ND	6.7	2.7	ug/kg	
67-66-3	Chloroform	ND	6.7	1.8	ug/kg	
95-49-8	o-Chlorotoluene	ND	6.7	1.3	ug/kg	
110-82-7	Cyclohexane	ND	6.7	1.7	ug/kg	
124-48-1	Dibromochloromethane	ND	6.7	1.3	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	6.7	2.6	ug/kg	
106-93-4	1,2-Dibromoethane	ND	6.7	1.3	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	6.7	2.7	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	6.7	1.3	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	6.7	1.3	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	6.7	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.7	2.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.7	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.7	1.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.7	1.8	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.7	1.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.7	1.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.7	1.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.7	1.3	ug/kg	
123-91-1	1,4-Dioxane	ND	270	54	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-3		
Lab Sample ID:	FA40755-4	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	86.2
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	6.7	1.3	ug/kg	
76-13-1	Freon 113	ND	6.7	1.8	ug/kg	
591-78-6	2-Hexanone	ND	33	10	ug/kg	
98-82-8	Isopropylbenzene	ND	6.7	1.3	ug/kg	
79-20-9	Methyl Acetate	ND	33	12	ug/kg	
74-83-9	Methyl Bromide	ND	6.7	2.7	ug/kg	
74-87-3	Methyl Chloride	ND	6.7	2.7	ug/kg	
108-87-2	Methylcyclohexane	ND	6.7	2.3	ug/kg	
75-09-2	Methylene Chloride [b]	5.7	13	5.3	ug/kg	JB
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	33	10	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	6.7	1.3	ug/kg	
103-65-1	n-Propylbenzene	ND	6.7	1.3	ug/kg	
100-42-5	Styrene	ND	6.7	1.3	ug/kg	
75-85-4	Tert-Amyl Alcohol	ND	67	18	ug/kg	
75-65-0	Tert-Butyl Alcohol	ND	67	24	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.7	1.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.7	1.7	ug/kg	
109-99-9	Tetrahydrofuran	ND	13	3.4	ug/kg	
108-88-3	Toluene	ND	6.7	1.3	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	6.7	1.9	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	6.7	1.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.7	1.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.7	1.3	ug/kg	
79-01-6	Trichloroethylene	ND	6.7	1.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	6.7	2.7	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	6.7	1.3	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	6.7	1.3	ug/kg	
75-01-4	Vinyl Chloride	ND	6.7	1.3	ug/kg	
	m,p-Xylene	ND	13	1.5	ug/kg	
95-47-6	o-Xylene	ND	6.7	1.3	ug/kg	
1330-20-7	Xylene (total)	ND	20	2.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%	111%	75-124%
17060-07-0	1,2-Dichloroethane-D4	120%	120%	72-135%
2037-26-5	Toluene-D8	116%	111%	75-126%
460-00-4	4-Bromofluorobenzene	136% [c]	129%	71-133%

(a) Confirmation run for internal standard areas.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BKGSS-3		
Lab Sample ID:	FA40755-4	**Date Sampled:**	01/26/17
Matrix:	SO - Soil	**Date Received:**	01/27/17
Method:	SW846 8260C	**Percent Solids:**	86.2
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(b) Suspected laboratory contaminant.
(c) Outside control limits due to matrix interference.

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ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-3		
Lab Sample ID:	FA40755-4	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP VPH REV 1.1	Percent Solids:	86.2
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UV077774.D	1	02/01/17	AJC	n/a	n/a	GUV4135
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.50 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	7400	2600	ug/kg	
	C9- C12 Aliphatics (Unadj.)	ND	7400	2600	ug/kg	
	C9- C10 Aromatics (Unadj.)	ND	7400	2600	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	100%		70-130%
460-00-4	BFB	95%		70-130%

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ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	BKGSS-3		
Lab Sample ID:	FA40755-4	Date Sampled:	01/26/17
Matrix:	SO - Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3546	Percent Solids:	86.2
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017406.D	1	02/10/17	MG	02/01/17	OP63645	GNN879
Run #2							

	Initial Weight	Final Volume
Run #1	19.9 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	27000	12000	8700	ug/kg	
	C9-C18 Aliphatics	ND	12000	5800	ug/kg	
	C19-C36 Aliphatics	ND	12000	5800	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	43%		40-140%
580-13-2	2-Bromonaphthalene	95%		40-140%
84-15-1	o-Terphenyl	70%		40-140%
321-60-8	2-Fluorobiphenyl	100%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	FB-012517		
Lab Sample ID:	FA40755-5	Date Sampled:	01/25/17
Matrix:	AQ - Field Blank Soil	Date Received:	01/27/17
Method:	SW846 8260C	Percent Solids:	n/a
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	1A03103.D	1	02/08/17	AJ	n/a	n/a	V1A117
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene [a]	ND	1.0	0.31	ug/l	
100-44-7	Benzyl Chloride	ND	2.0	0.36	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.45	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.24	ug/l	
75-25-2	Bromoform	ND	1.0	0.41	ug/l	
78-93-3	2-Butanone (MEK)	ND	5.0	2.0	ug/l	
104-51-8	n-Butylbenzene	ND	1.0	0.23	ug/l	
135-98-8	sec-Butylbenzene	ND	1.0	0.24	ug/l	
75-15-0	Carbon Disulfide	ND	2.0	0.53	ug/l	
56-23-5	Carbon Tetrachloride	ND	1.0	0.36	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.67	ug/l	
67-66-3	Chloroform	ND	1.0	0.30	ug/l	
95-49-8	o-Chlorotoluene	ND	1.0	0.22	ug/l	
110-82-7	Cyclohexane	ND	1.0	0.39	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.28	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	2.0	0.28	ug/l	
75-71-8	Dichlorodifluoromethane	ND	2.0	0.50	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	0.32	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	0.22	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	0.26	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.34	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.31	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.32	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.22	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.43	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.29	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
123-91-1	1,4-Dioxane	ND	200	75	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FB-012517		
Lab Sample ID:	FA40755-5	**Date Sampled:**	01/25/17
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/27/17
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	BMSMC, Humacao, PR		

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	1.0	0.36	ug/l	
76-13-1	Freon 113	ND	1.0	0.48	ug/l	
591-78-6	2-Hexanone [a]	ND	10	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.22	ug/l	
79-20-9	Methyl Acetate	ND	20	5.0	ug/l	
74-83-9	Methyl Bromide	ND	2.0	0.59	ug/l	
74-87-3	Methyl Chloride	ND	2.0	0.50	ug/l	
108-87-2	Methylcyclohexane [a]	ND	1.0	0.44	ug/l	
75-09-2	Methylene Chloride	ND	5.0	2.0	ug/l	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	5.0	1.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.23	ug/l	
103-65-1	n-Propylbenzene	ND	1.0	0.29	ug/l	
100-42-5	Styrene	ND	1.0	0.22	ug/l	
75-85-4	Tert-Amyl Alcohol	ND	20	5.3	ug/l	
75-65-0	Tert-Butyl Alcohol	ND	20	5.3	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.22	ug/l	
109-99-9	Tetrahydrofuran	ND	5.0	1.6	ug/l	
108-88-3	Toluene	ND	1.0	0.30	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.61	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.25	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.47	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.35	ug/l	
75-69-4	Trichlorofluoromethane	ND	2.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.32	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	0.27	ug/l	
75-01-4	Vinyl Chloride	ND	1.0	0.41	ug/l	
	m,p-Xylene	ND	2.0	0.47	ug/l	
95-47-6	o-Xylene	ND	1.0	0.26	ug/l	
1330-20-7	Xylene (total)	ND	3.0	0.72	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		83-118%
17060-07-0	1,2-Dichloroethane-D4	102%		79-125%
2037-26-5	Toluene-D8	100%		85-112%
460-00-4	4-Bromofluorobenzene	101%		83-118%

(a) Associated calibration passes using linear regression. Reprocessed low standard outside 70-130% method limits.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: UV077881.D

SGS Accutest

Report of Analysis

Client Sample ID:	FB-012517		
Lab Sample ID:	FA40755-5	Date Sampled:	01/25/17
Matrix:	AQ - Field Blank Soil	Date Received:	01/27/17
Method:	MADEP VPH REV 1.1	Percent Solids:	n/a
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UV077881.D	1	02/07/17	AJC	n/a	n/a	GUV4141
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	100	35	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	100	35	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	100	35	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	96% a		70-130%
460-00-4	BFB	90% a		70-130%

(a) Surrogate recoveries corrected for actual spike amount.

COLEGIO DE QUÍMICOS DE PUERTO RICO
Manuel Infante Méndez
1888
QUÍMICO LICENCIADO

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: NN017294.D

SGS Accutest

Report of Analysis

Client Sample ID:	FB-012517		
Lab Sample ID:	FA40755-5	Date Sampled:	01/25/17
Matrix:	AQ - Field Blank Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017294.D	1	02/03/17	MG	01/31/17	OP63636	GNN873
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	250	190	ug/l	
	C9-C18 Aliphatics	ND	250	130	ug/l	
	C19-C36 Aliphatics	ND	250	130	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	57%		40-140%
580-13-2	2-Bromonaphthalene	75%		40-140%
84-15-1	o-Terphenyl	79%		40-140%
321-60-8	2-Fluorobiphenyl	83%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	FB-012617		
Lab Sample ID:	FA40755-6	Date Sampled:	01/26/17
Matrix:	AQ - Field Blank Soil	Date Received:	01/27/17
Method:	MADEP EPH REV 1.1 SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN017321.D	1	02/03/17	MG	01/31/17	OP63636	GNN874
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	ND	250	190	ug/l	
	C9-C18 Aliphatics	ND	250	130	ug/l	
	C19-C36 Aliphatics	ND	250	130	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	67%		40-140%
580-13-2	2-Bromonaphthalene	71%		40-140%
84-15-1	o-Terphenyl	49%		40-140%
321-60-8	2-Fluorobiphenyl	48%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: Y33443.D Y33444.D

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA40755
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Humacao, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA40755-4MS	Y33443.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4MSD	Y33444.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4	Y33442.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4 [a]	Y33447.D	1	01/30/17	EP	n/a	n/a	VY1327

The QC reported here applies to the following samples: Method: SW846 8260C

FA40755-1, FA40755-2, FA40755-3, FA40755-4

CAS No.	Compound	FA40755-4 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	ND		338	257	76	301	248	82	4	61-152/27
71-43-2	Benzene	ND		67.6	54.1	80	60.3	50.3	83	7	76-126/26
100-44-7	Benzyl Chloride	ND		67.6	30.4	45*	60.3	29.8	49*	2	65-126/31
74-97-5	Bromochloromethane	ND		67.6	55.7	82	60.3	52.5	87	6	77-120/24
75-27-4	Bromodichloromethane	ND		67.6	61.0	90	60.3	58.6	97	4	74-130/25
75-25-2	Bromoform	ND		67.6	59.4	88	60.3	48.0	80	21	76-127/26
78-93-3	2-Butanone (MEK)	ND		338	257	76	301	238	79	8	75-137/25
104-51-8	n-Butylbenzene	ND		67.6	40.2	59*	60.3	35.6	59*	12	71-128/35
135-98-8	sec-Butylbenzene	ND		67.6	48.9	72*	60.3	44.0	73*	11	79-135/34
75-15-0	Carbon Disulfide	ND		67.6	53.5	79	60.3	46.9	78	13	72-122/29
56-23-5	Carbon Tetrachloride	ND		67.6	51.1	76*	60.3	48.7	81	5	78-133/29
108-90-7	Chlorobenzene	ND		67.6	62.7	93	60.3	50.5	84	22	81-129/29
75-00-3	Chloroethane	ND		67.6	61.9	92	60.3	58.8	98	5	68-133/29
67-66-3	Chloroform	ND		67.6	59.0	87	60.3	54.9	91	7	72-123/26
95-49-8	o-Chlorotoluene	ND		67.6	66.8	99	60.3	62.2	103	7	77-129/33
110-82-7	Cyclohexane	ND		67.6	33.3	49*	60.3	36.3	60*	9	73-126/32
124-48-1	Dibromochloromethane	ND		67.6	73.1	108	60.3	56.8	94	25	76-127/27
96-12-8	1,2-Dibromo-3-chloropropane	ND		67.6	60.9	90	60.3	58.0	96	5	70-137/29
106-93-4	1,2-Dibromoethane	ND		67.6	70.2	104	60.3	57.3	95	20	77-126/26
75-71-8	Dichlorodifluoromethane	ND		67.6	48.7	72	60.3	49.6	82	2	68-168/29
95-50-1	1,2-Dichlorobenzene	ND		67.6	48.5	72*	60.3	46.9	78*	3	80-129/32
541-73-1	1,3-Dichlorobenzene	ND		67.6	51.6	76*	60.3	49.0	81	5	81-129/33
106-46-7	1,4-Dichlorobenzene	ND		67.6	51.7	76	60.3	49.9	83	4	76-130/32
75-34-3	1,1-Dichloroethane	ND		67.6	62.2	92	60.3	57.7	96	8	73-125/27
107-06-2	1,2-Dichloroethane	ND		67.6	68.5	101	60.3	62.8	104	9	74-128/23
75-35-4	1,1-Dichloroethylene	ND		67.6	57.3	85	60.3	50.3	83	13	81-136/28
156-59-2	cis-1,2-Dichloroethylene	ND		67.6	48.3	71*	60.3	60.8	101	23	74-126/26
156-60-5	trans-1,2-Dichloroethylene	ND		67.6	63.2	93	60.3	57.2	95	10	70-127/27
78-87-5	1,2-Dichloropropane	ND		67.6	58.3	86	60.3	54.3	90	7	74-125/25
10061-01-5	cis-1,3-Dichloropropene	ND		67.6	45.3	67*	60.3	49.5	82	9	80-123/26
10061-02-6	trans-1,3-Dichloropropene	ND		67.6	69.5	103	60.3	57.3	95	19	75-131/28
123-91-1	1,4-Dioxane	ND		1350	1800	133	1210	1190	99	41*	56-152/37
100-41-4	Ethylbenzene	ND		67.6	63.8	94	60.3	50.7	84	23	77-123/31
76-13-1	Freon 113	ND		67.6	49.0	72	60.3	44.2	73	10	71-129/30
591-78-6	2-Hexanone	ND		338	332	98	301	255	85	26	72-133/26
98-82-8	Isopropylbenzene	ND		67.6	57.4	85	60.3			22	80-136/32

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA40755
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Humacao, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA40755-4MS	Y33443.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4MSD	Y33444.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4	Y33442.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4 [a]	Y33447.D	1	01/30/17	EP	n/a	n/a	VY1327

The QC reported here applies to the following samples: Method: SW846 8260C

FA40755-1, FA40755-2, FA40755-3, FA40755-4

CAS No.	Compound	FA40755-4 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
79-20-9	Methyl Acetate	ND		338	188	56*	301	138	46*	31*	67-137/30
74-83-9	Methyl Bromide	ND		67.6	42.3	63*	60.3	41.3	68	2	65-139/31
74-87-3	Methyl Chloride	ND		67.6	51.5	76	60.3	50.6	84	2	71-144/27
108-87-2	Methylcyclohexane	ND		67.6	29.6	44*	60.3	28.0	46*	6	75-128/31
75-09-2	Methylene Chloride	5.7	JB	67.6	68.4	93	60.3	59.5	89	14	74-137/28
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		338	413	122	301	322	107	25	76-132/26
1634-04-4	Methyl Tert Butyl Ether	ND		67.6	64.7	96	60.3	65.6	109	1	77-120/24
103-65-1	n-Propylbenzene	ND		67.6	66.3	98	60.3	60.4	100	9	80-135/33
100-42-5	Styrene	ND		67.6	56.2	83	60.3	46.6	77*	19	78-125/30
75-85-4	Tert-Amyl Alcohol	ND		676	857	127	603	632	105	30	69-130/32
75-65-0	Tert-Butyl Alcohol	ND		676	998	148*	603	715	119	33*	74-126/32
79-34-5	1,1,2,2-Tetrachloroethane	ND		67.6	76.9	114	60.3	68.5	114	12	71-126/30
127-18-4	Tetrachloroethylene	ND		67.6	61.4	91	60.3	48.0	80	24	79-130/31
109-99-9	Tetrahydrofuran	ND		67.6	24.9	37*	60.3	22.1	37*	12	70-133/26
108-88-3	Toluene	ND		67.6	69.7	103	60.3	52.8	88	28	76-124/30
87-61-6	1,2,3-Trichlorobenzene	ND		67.6	20.2	30*	60.3	20.6	34*	2	77-128/35
120-82-1	1,2,4-Trichlorobenzene	ND		67.6	25.3	37*	60.3	24.3	40*	4	78-130/34
71-55-6	1,1,1-Trichloroethane	ND		67.6	51.7	76	60.3	50.7	84	2	70-129/27
79-00-5	1,1,2-Trichloroethane	ND		67.6	76.1	113	60.3	59.5	99	24	74-124/28
79-01-6	Trichloroethylene	ND		67.6	55.8	83	60.3	50.3	83	10	75-128/27
75-69-4	Trichlorofluoromethane	ND		67.6	59.4	88	60.3	53.8	89	10	73-145/31
95-63-6	1,2,4-Trimethylbenzene	ND		67.6	63.9	95	60.3	58.0	96	10	74-123/34
108-67-8	1,3,5-Trimethylbenzene	ND		67.6	64.8	96	60.3	58.1	96	11	73-122/33
75-01-4	Vinyl Chloride	ND		67.6	50.6	75*	60.3	51.2	85	1	76-141/27
	m,p-Xylene	ND		135	132	98	121	105	87	23	80-128/30
95-47-6	o-Xylene	ND		67.6	64.5	95	60.3	51.1	85	23	80-132/30
1330-20-7	Xylene (total)	ND		203	197	97	181	156	86	23	80-129/30

CAS No.	Surrogate Recoveries	MS	MSD	FA40755-4	FA40755-4	Limits
1868-53-7	Dibromofluoromethane	102%	106%	106%	111%	75-124%
17060-07-0	1,2-Dichloroethane-D4	109%	110%	120%	120%	72-135%
2037-26-5	Toluene-D8	126%	104%	116%	111%	75-126%
460-00-4	4-Bromofluorobenzene	124%	122%	136%* [b]	129%	71-133%

* = Outside of Control Limits.

6.3.1 6

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA40755
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Humacao, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA40755-4MS	Y33443.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4MSD	Y33444.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4	Y33442.D	1	01/30/17	EP	n/a	n/a	VY1327
FA40755-4 [a]	Y33447.D	1	01/30/17	EP	n/a	n/a	VY1327

The QC reported here applies to the following samples: Method: SW846 8260C

FA40755-1, FA40755-2, FA40755-3, FA40755-4

(a) Confirmation run for internal standard areas.
(b) Outside control limits due to matrix interference.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA40755
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Humacao, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA40755-4MS	UV077777.D	1	02/01/17	AJC	n/a	n/a	GUV4135
FA40755-4MSD	UV077778.D	1	02/01/17	AJC	n/a	n/a	GUV4135
FA40755-4	UV077774.D	1	02/01/17	AJC	n/a	n/a	GUV4135

The QC reported here applies to the following samples: Method: MADEP VPH REV 1.1

FA40755-1, FA40755-2, FA40755-3, FA40755-4

CAS No.	Compound	FA40755-4 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
	C5- C8 Aliphatics (Unadj.)	ND		36100	21000	58*	36100	20800	58*	1	70-130/50
	C9- C12 Aliphatics (Unadj.)	ND		30100	10000	33*	30100	9970	33*	0	70-130/50
	C9- C10 Aromatics (Unadj.)	ND		18100	5490	30*	18100	5080	28*	8	70-130/50

CAS No.	Surrogate Recoveries	MS	MSD	FA40755-4	Limits
460-00-4	BFB	94%	89%	100%	70-130%
460-00-4	BFB	88%	84%	95%	70-130%

* = Outside of Control Limits.

Raw Data: NN017407.D NN017408.D

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA40755
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Humacao, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP63645-MS	NN017407.D	1	02/10/17	MG	02/01/17	OP63645	GNN879
OP63645-MSD	NN017408.D	1	02/10/17	MG	02/01/17	OP63645	GNN879
FA40755-4	NN017406.D	1	02/10/17	MG	02/01/17	OP63645	GNN879

The QC reported here applies to the following samples: Method: MADEP EPH REV 1.1

FA40755-1, FA40755-2, FA40755-3, FA40755-4

CAS No.	Compound	FA40755-4 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
	C11-C22 Aromatics (Unadj.)	27000		101000	75200	48	98600	71500	45	5	40-140/50
	C9-C18 Aliphatics	ND		35500	15500	44	34800	12400	36*	22	40-140/50
	C19-C36 Aliphatics	ND		47400	27700	58	46400	24200	52	13	40-140/50

CAS No.	Surrogate Recoveries	MS	MSD	FA40755-4	Limits
3386-33-2	1-Chlorooctadecane	57%	49%	43%	40-140%
580-13-2	2-Bromonaphthalene	74%	74%	95%	40-140%
84-15-1	o-Terphenyl	58%	54%	70%	40-140%
321-60-8	2-Fluorobiphenyl	78%	78%	100%	40-140%

10.3.1 10

* = Outside of Control Limits.

ACCUTEST LABORATORIES

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FA40755 PAGE 1 OF 1

FL

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FED-EX Tracking # 779285506710 | Bottle Order Control # | Accutest Quote # | Accutest Job #

Client / Reporting Information	Project Information	Requested Analysis (see TEST CODE sheet)	Matrix Codes
Company Name: Anderson Mulholland & Associates	Project Name: Bristol-Myers Squibb Manufacturing Co., Surface Soil Sampling		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED-Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB-Field Blank EB-Equipment Blank RB- Rinse Blank TB-Trip Blank
Street Address: 2700 Westchester Avenue, Suite 417	Street:	Billing Information (if different from Report to)	
City: Purchase State: NY Zip: 10577	City: Humacao State: PR	Company Name	
Project Contact: Terry Taylor E-mail	Project #:	Street Address	
Phone #: 914-251-0400 Fax #	Client Purchase Order #	City State Zip	
Sampler(s) Name(s) Phone #	Project Manager: Terry Taylor	Attention:	

Accutest Sample #	Field ID / Point of Collection	MEOH+DI Vol #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	H2SO4	NaOH	HNO3	DI Water	MEOH	ENCORE	VB268TCL20	VMS+624TMB	VMS+BNZCHL	VMS+IPTOLU	VMS+TAA	VMS+TBA	VMS+THF	VMS + n-Butylbenzene	VMS + n-Propylbenzene	VMS + sec-Butylbenzene	LAB USE ONLY
1	BKGSS-1		1/26/17	0930		SO								3	X	X	X	X	X	X	X	X	X	X	
2	BKGSS-2		1/26/17	1030		SO								3	X	X	X	X	X	X	X	X	X	X	
3	BKGSS-2DUP		1/26/17	1030		SO								3	X	X	X	X	X	X	X	X	X	X	
4	BKGSS-3		1/26/17	1145		SO								3	X	X	X	X	X	X	X	X	X	X	
4	BKGSS-3MS		1/26/17	1145		SO								3	X	X	X	X	X	X	X	X	X	X	
4	BKGSS-3MSD		1/26/17	1145		SO								3	X	X	X	X	X	X	X	X	X	X	
	~~EB-012517~~		~~1/25/17~~	0918		EB									X	X	X	X	X	X	X	X	X	X	
5	FB-012517		1/25/17	1456		FB	3	3				4			X	X	X	X	X	X	X	X	X	X	
	~~EB-012617~~		~~1/26/17~~	1245	TT	EB									X	X	X	X	X	X	X	X	X	X	
6	FB-012617		1/26/17	1030	TT	FB	3	3				4			X	X	X	X	X	X	X	X	X	X	

Turnaround Time (Business days) | Approved By (Accutest PM) / Date: | Data Deliverable Information | Comments / Special Instructions

- [X] Std. 10 Business Days
- [ ] Std. 10 Business Days (by Contract only)
- [ ] 10 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY

Emergency & Rush T/A data available VIA Labtrak

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	1/26/1700	1 FedEx	2 Fx		2 01/27/17
3		3	4		4
5		5	Custody Seals # 442,279,280 ☐ Intact ☐ Not Intact	Preserved where applicable ☐	On Ice ☐ Cooler Temp. 3.5

5.1
5

FA40755: Chain of Custody
Page 1 of 4

ACCUTEST LABORATORIES

FL

CHAIN OF CUSTODY

FA40755 PAGE 1 OF 1

4405 Vineland Road, Suite C-15, Orlando, Florida 32811
TEL: 407-425-6700 FAX: 407-425-0707
www.accutest.com

FEDEX Tracking # 778283506710

Bottle Order Control #

Accutest Quote #

Accutest Job #

Client / Reporting Information

Company Name: Anderson Mulholland & Associates

Street Address: 2700 Westchester Avenue, Suite 417

City: Purchase State: NY Zip: 10577

Project Contact: Terry Taylor E-mail:

Phone #: 914-251-0400 Fax #:

Sampler(s) Name(s): Phone #:

Project Information

Project Name: Bristol-Myers Squibb Manufacturing Co., Surface Soil Sampling

Street:

City: Humacao State: PR

Project #:

Client Purchase Order #:

Project Manager: Terry Taylor

Billing Information (if different from Report to)

Company Name:

Street Address:

City State Zip:

Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	H2SO4	NaOH	HNO3	DI Water	MEOH	EnCore	VMAVPH R	BMAEPH R	LAB USE ONLY
1	BKG SS-1		1/26/17	0930	TT	SO	4					1	2		X	X	
2	BKG SS-2		1/26/17	1030	TT	SO	4					1	2		X	X	
3	BKG SS-2 DUP		1/26/17	1030	TT	SO	3					1	2		X	X	
4	BKG SS-3		1/26/17	1145	TT	SO	4					1	2		X	X	
4	BKG SS-3 MS		1/26/17	1145	TT	SO	3					1	2		X	X	
4	BKG SS-3 MSD		1/26/17	1145	TT	SO	3					1	2		X	X	
6	FB 012617		1/26/17	1030	TT	FB	5	5							X	X	
5	EB 012617		1/26/17	1245	TT	EB	3	3							3	X	

Turnaround Time (Business days)

- [X] Std. 10 Business Days
- [ ] Std. 10 Business Days (by Contract only)
- [ ] 10 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY

Emergency & Rush T/A data available VIA Labline

Approved By (Accutest PM): / Date:

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Only report Aliphatic and Aromatic fractions, Do not report individual PAHs

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
1		1/26/17 1700	1 Fed EX	2 FX		2 01/27/17
3	Relinquished by Sampler:	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
5	Relinquished by:	Date Time:	Received By: 5	Custody Seal # 842,279,280 Intact / Not Intact	Preserved where applicable	On Ice / Cooler Temp.

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EXECUTIVE NARRATIVE

SDG No:	**FA40755**	Laboratory:	**Accutest, Florida**
Analysis:	**MADEP EPH**	Number of Samples:	**8**
Location:	BMSMC, Humacao, PR Humacao, PR		

SUMMARY: Eight (8) samples were analyzed for Extractable TPHC Ranges by method MADEP EPH. Samples were validated following the METHOD FOR THE DETERMINATION OF EXTRACTABLES PETROLEUM HYDROCARBONS (EPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: **None**
Major: **None**
Minor: **None**

Critical findings: **None**
Major findings: **None**
Minor findings: 1. Sample FA40755-5 identified as EB-012617 and FB-012517 in c-o-c form. Only the FB-012517 reported.

2. MS/MSD % recovery and RPD within laboratory control limits except for the cases described in the Data Review Worksheet. No qualification performed, professional judgment.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: 

Date: February 17, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA40755-1
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	25300	ug/kg	1	-	U	Yes
Ç9 - C18 Aliphatics	12000	ug/kg	1	-	U	Yes
Ç19 - C36 Aliphatics	12000	ug/kg	1	-	U	Yes

Sample ID: FA40755-2
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	13000	ug/kg	1	-	U	Yes
Ç9 - C18 Aliphatics	13000	ug/kg	1	-	U	Yes
Ç19 - C36 Aliphatics	13000	ug/kg	1	-	U	Yes

Sample ID: FA40755-3
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2016
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	12000	ug/kg	1	-	U	Yes
Ç9 - C18 Aliphatics	12000	ug/kg	1	-	U	Yes
Ç19 - C36 Aliphatics	12000	ug/kg	1	-	U	Yes

Sample ID: FA40755-4
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	27400	ug/kg	1	-	-	Yes
Ç9 - C18 Aliphatics	12000	ug/kg	1	-	U	Yes
Ç19 - C36 Aliphatics	12000	ug/kg	1	-	U	Yes

Sample ID: FA40755-5
Sample location: BMSMC, Humacao, PR
Sampling date: 1/25/2017
Matrix: AQ - Field Blank Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	250	ug/l	1	-	U	Yes
Ç9 - C18 Aliphatics	250	ug/l	1	-	U	Yes
Ç19 - C36 Aliphatics	250	ug/l	1	-	U	Yes

Sample ID: FA40755-6
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: AQ - Field Blank Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	250	ug/l	1	-	U	Yes
Ç9 - C18 Aliphatics	250	ug/l	1	-	U	Yes
Ç19 - C36 Aliphatics	250	ug/l	1	-	U	Yes

Sample ID: FA40755-4MS
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	101000	ug/kg	1	-	-	Yes
Ç9 - C18 Aliphatics	35500	ug/kg	1	-	-	Yes
Ç19 - C36 Aliphatics	47400	ug/kg	1	-	-	Yes

Sample ID: FA40755-4MSD
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	71500	ug/kg	1	-	-	Yes
Ç9 - C18 Aliphatics	12400	ug/kg	1	-	-	Yes
Ç19 - C36 Aliphatics	24200	ug/kg	1	-	-	Yes

DATA REVIEW WORKSHEETS

Type of validation Full:__X____ Project Number:_FA40755_____
Limited:_____ Date:_____01/26/2017_____
Shipping date:__01/26/2017_____
EPA Region:_____2_____

REVIEW OF EXTRACTABLE PETROLEUM HYDROCARBON (EPHs) PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to the data validation guidance documents in the following order of precedence METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (EPH), Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Accutest_Laboratories_-_Orlando_____ data package received has been reviewed and the quality control and performance data summarized. The data review for SVOCs included:

Lab. Project/SDG No.: __FA40755_____ Sample matrix: _____Soil_____
No. of Samples: _____8_____
Field blank No.: _____FA40755-5;_ FA40755-6_____
Equipment blank No.: _____
Trip blank No.: _____-_____
Field duplicate No.:_____FA40755-2/FA40755-3_____

__X____ Data Completeness
__X____ Holding Times
__N/A__ GC/MS Tuning
__N/A__ Internal Standard Performance
__X____ Blanks
__X____ Surrogate Recoveries
__X____ Matrix Spike/Matrix Spike Duplicate
___X__ Laboratory Control Spikes
___X__ Field Duplicates
___X__ Calibrations
___X__ Compound Identifications
___X__ Compound Quantitation
___X__ Quantitation Limits

Overall Comments:
_Extractable_Petroleum_Hydrocarbons_by_GC_by_Method_MADEP_EPH,_REV_1.1._____

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer:_____

Date:_____February_17,_2017_____

All criteria were met __x___
Criteria were not met and/or see below _____

I. DATA COMPLETNESS
A. Data Package:

MISSING INFORMATION DATE LAB. CONTACTED DATE RECEIVED

B. Other Discrepancies:

_Sample_FA40755-5_identified_as_EB-012617_and_FB-012517_in_c-o-c_form._Only_
_the_FB-012517_reported._____

All criteria were met ___X___
Criteria were not met and/or see below _____

HOLDING TIMES
The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples extracted and analyzed within method recommended holding time				

Criteria

Preservation:

Aqueous samples must be acidified to a pH of 2.0 or less at the time of collection.
Soil samples must be cooled at 4 ± 2 °C immediately after collection.

Holding times:

Samples must be extracted within 14 days of collection, and analyzed within 40 days of extraction.

Cooler temperature (Criteria: 4 ± 2 °C):___3.5°C_____

Actions: Qualify positive results/nondetects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).
If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).
If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

All criteria were met ___X___
Criteria were not met and/or see below _____

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____10/29/16_____

Dates of initial calibration verification:_____10/29/16_____

Instrument ID numbers:_____FID_7_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and continuing calibration meet method specific requirements				

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C9-C18 Aliphatic Hydrocarbons, C19-C36 Aliphatic Hydrocarbons, and C11-C22 Aromatic Hydrocarbons using the FID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.
    - The area for the surrogates must be subtracted from the area summation of the range in which they elute.
    - The areas associated with naphthalene and 2-methylnaphthalene in the aliphatic range standard must be subtracted from the uncorrected collective C9-C18 Aliphatic Hydrocarbon range area prior to calculating the CF.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples or every 24 hours (whichever is more frequent), and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects.
If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____10/29/16_____

Dates of continuing calibration verification:___02/02/17;_02/03/17;_02/08/17;_02/10/17_

Dates of final calibration verification:__02/03/17;_02/08/17;_02/10/17_____

Instrument ID numbers:_____FID-7_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and continuing calibration meets method specific requirements.				

Note:

A separate worksheet should be filled for each initial curve.

All criteria were met ___X___
Criteria were not met and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data. A Laboratory Method Blank must be run after samples suspected of being highly contaminated to determine if sample carryover has occurred.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
__METHOD_BLANKS_MEET_THE_METHOD_SPECIFIC_CRITERIA.				

Note:

Field/Trip/Equipment

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_NO_TRIP/EQUIPMENT_BLANK_ANALYZED_ASSOCIATED_WITH_THIS_DATA_____ _PACKAGE._NO_TARGET_ANALYTES_DETECTED_IN_FIELD_BLANK_____ _ASSOCIATED_WITH_THIS_DATA_PACKAGE.				

All criteria were met __X___
Criteria were not met and/or see below _____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but < AL, report the compound as not detected (U) at the reported concentration.
If the concentration is > AL, report the concentration unqualified.

All criteria were met __X___
Criteria were not met and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	S1	S2	S3	S4	

_SURROGATE_STANDARDS_RECOVERIES_WITHIN_LABORATORY_CONTROL__
_LIMITS_____

Note:

S1 = o-Terphenyl 40-140% S2 = 2-Fluorobiphenyl 40-140%
S3 = 1-Chlorooctadecane 40-140% S4 = 2-Bromonaphthalene 40-140%

QC Limits (%)* (Aqueous)
_LL_to_UL_ _40_to_140_ _40_to_140_ _40_to_140_ _40_to_140_
QC Limits* (Solid)
_LL_to_UL_ _40_to_140_ _40_to_140_ _40_to_140_ _40_to_140_

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 40% or more than 140%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

(1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
(2) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

All criteria were met _____
Criteria were not met and/or see below __X___

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- **Matrix duplicate** - Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 40 - 140% of the true value. Lower recoveries of n-nonane are permissible but must be noted in the narrative if <30%.

MS/MSD Recoveries and Precision Criteria

Sample ID:_FA40755-4_MS/MSD_____ Matrix/Level:__Soil_____

List the %Rs, RPD of the compounds which do not meet the QC criteria.

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
_MSD_____	C9_-_C18_Aliphatics_____	36_____		40-140/50_____	No_action_

Note: No action taken; professional judgment. MS % recovery results within laboratory control limits.

All criteria were met __X___
Criteria were not met and/or see below _____

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRATION SAMPLE	MS	MSD	%RPD	ACTION

Criteria: None specified, use %RSD ≤ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J).
If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

All criteria were met __X___
Criteria were not met and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT	ACTION

__LCS_RECOVERY_WITHIN_LABORATORY_CONTROL_LIMTS._____

Note:

Criteria:

* Refer to QAPP for specific criteria.
* The spike recovery must be between 40% and 140%. Lower recoveries of n-nonane are permissible. If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative. RPD between LCS/LCSD must be < 25%.

Actions:
Actions on LCS recovery should be based on both the number of compounds that are outside the %R and RPD criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.
If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.
If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? **Yes** or No.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

All criteria were met __X___
Criteria were not met and/or see below _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs: __FA40651-1/FA40651-1DUP_____ Matrix:__Aqueous_____
Sample IDs: __FA40754-1/FA40754-1DUP_____ Matrix:__Soil_____
Sample IDs: __FA40755-2/FA40755-3_____ Matrix:__Soil_____

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Laboratory/fied duplicates analyzed with this data package. RPD within laboratory and generally acceptable control limits					

Criteria:

The project QAPP should be reviewed for project-specific information.
RPD $\pm$ 30% for aqueous samples, RPD $\pm$ 50 % for solid samples if results are $\geq$ SQL.
If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

SQL = soil quantitation limit

Actions:

If both the sample and the duplicate results are nondetects (ND), the RPD is not calculable (NC). No action is needed.

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.

If one sample result is not detected and the other is $\geq$ 5x the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

All criteria were met __X___
Criteria were not met and/or see below _____

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

1. Verify that the target analytes were within the retention time windows.

- Retention time windows must be re-established for each Target EPH Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
- The n-nonane (n-C9) peak must be adequately resolved from the solvent front of the chromatographic run.
- All surrogates must be adequately resolved from the Aliphatic Hydrocarbon and Aromatic Hydrocarbon standards.
- For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
- The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

1a. Aliphatic hydrocarbons range:

- Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for n-C9 and 0.01 minutes before the Rt for n-C19.
- Determine the total area count for all peaks eluting 0.01 minutes before the Rt for n-C19 and 0.1 minutes after the Rt for n-C36.

Are the aliphatic hydrocarbons range properly determined? **Yes**? or No?

Comments:

1b. Aromatic hydrocarbons range:

- Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for naphthalene and 0.1 minutes after the Rt for benzo(g,h,i)perylene.
- Determine the peak area count for the sample surrogate (OTP) and fractionation surrogate(s). Subtract these values from the collective area count value.

Are the aliphatic hydrocarbons range properly determined? **Yes**? or No?

Comments:

All criteria were met __X___
Criteria were not met and/or see below _____

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

3. Breakthrough determination - Each sample (field and QC sample) must be evaluated for potential breakthrough on a sample specific basis by evaluating the % recovery of the fractionation surrogate (2-bromonaphthalene) and on a batch basis by quantifying naphthalene and 2-methylnaphthalene in both the aliphatic and aromatic fractions of the LCS and LCSD. **If either the concentration of naphthalene or 2-methylnaphthalene in the aliphatic fraction exceeds 5% of the total concentration for naphthalene or 2-methylnaphthalene in the LCS or LCSD, fractionation must be repeated on all archived batch extracts.**

NOTE: **The total concentration of naphthalene or 2-methylnaphthalene in the LCS/LCSD pair includes the summation of the concentration detected in the aliphatic fraction and the concentration detected in the aromatic fraction.**

Comments:__Concentration_in_the_aliphatic_fraction_<_5%_of_the_total_____
_concentration_for_naphthalene_and_2-methylnaphthalene_____

4. **Fractionation Check Standard** – A fractionation check solution is prepared containing 14 alkanes and 17 PAHs at a nominal concentration of 200 ng/µl of each constituent. The Fractionation Check Solution must be used to evaluate the fractionation efficiency of each new lot of silica gel/cartridges, and establish the optimum hexane volume required to efficiently elute aliphatic hydrocarbons while not allowing significant aromatic hydrocarbon breakthrough. For each analyte contained in the fractionation check solution, excluding n-nonane, the Percent Recovery must be between 40 and 140%. A 30% Recovery is acceptable for n-nonane.

Is a fractionation check standard analyzed? Yes? or No?

Comments: Not applicable.

All criteria were met __X___
Criteria were not met and/or see below _____

XII. QUANTITATION LIMITS AND SAMPLE RESULTS

The sample quantitation evaluation is to verify laboratory quantitation results.

In order to demonstrate the absence of aliphatic mass discrimination, the response ratio of C28 to C20 must be at least 0.85. If <0.85, this nonconformance must be noted in the laboratory case narrative.

The chromatograms of Continuing Calibration Standards for aromatics must be reviewed to ensure that there are no obvious signs of mass discrimination.

Is aliphatic mass discrimination observed in the sample? Yes? or **No**?

Is aromatic mass discrimination observed in the sample? Yes? or **No**?

1. In the space below, please show a minimum of one sample calculation:

FA40755-4MS EPH (C9 – C36, Aliphatics) RF = 1.074×10^6

FID

[ ] = $251500593/1.074 \times 10^6$

= 234.2 ppm Ok

2. If requested, verify that the results were above the laboratory method detection limit (MDLs).

3. If dilutions performed, were the SQLs elevated accordingly by the laboratory? List the affected samples and dilution factor in the table below.

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

If dilution was not performed, estimate results (J) for the affected compounds. List the affected samples/compounds:

_____

_____

EXECUTIVE NARRATIVE

SDG No:	**FA40755**	Laboratory:	**Accutest, Florida**
Analysis:	**MADEP VPH**	Number of Samples:	**7**
Location:	BMSMC, Humacao, PR Humacao, PR		

SUMMARY: Seven (7) samples were analyzed for Volatiles TPHC Ranges by method MADEP VPH. Samples were validated following the METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: **None**
Major: **None**
Minor: **None**

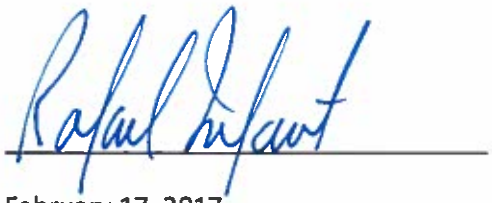
Critical findings: **None**
Major findings: **None**
Minor findings:

1. The % difference in the continuing and ending calibration verification for the C5-C8 hydrocarbon range outside the method performance criteria. Results qualified as estimated (J or UJ) in affected samples.

2. MS/MSD % recovery and RPD within laboratory control limits except for the cases described in the Data Review Worksheet. Results qualified as estimated (UJ) in sample FA40755-4.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: 

Date: February 17, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA40755-1
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	5600	ug/kg	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	5600	ug/kg	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	5600	ug/kg	1	-	U	Yes

Sample ID: FA40755-2
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	8300	ug/kg	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	8300	ug/kg	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	8300	ug/kg	1	-	U	Yes

Sample ID: FA40755-3
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2016
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	25000	ug/kg	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	25000	ug/kg	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	25000	ug/kg	1	-	U	Yes

Sample ID: FA40755-4
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	7400	ug/kg	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	7400	ug/kg	1	-	UJ	Yes
Ç9 - C10 Aromatics (Unadj.)	7400	ug/kg	1	-	UJ	Yes

Sample ID: FA40755-5
Sample location: BMSMC, Humacao, PR
Sampling date: 1/25/2017
Matrix: AQ - Field Blank Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	100	ug/l	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	100	ug/l	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	100	ug/l	1	-	U	Yes

Sample ID: FA40755-4MS
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	21000	ug/kg	1	-	-	Yes
Ç9 - C12 Aliphatics (Unadj.)	10000	ug/kg	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	5490	ug/kg	1	-	-	Yes

Sample ID: FA40755-4MSD
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	20800	ug/kg	1	-	-	Yes
Ç9 - C12 Aliphatics (Unadj.)	9970	ug/kg	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	5080	ug/kg	1	-	-	Yes

DATA REVIEW WORKSHEETS

Type of validation Full:__X____ Project Number:_FA40755_____
Limited:_____ Date:_____01/26/2017_____
Shipping date:_____01/26/2017_____
EPA Region:_____2_____

REVIEW OF VOLATILE PETROLEUM HYDROCARBON (VPHs) PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to the data validation guidance documents in the following order of precedence METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH), Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Accutest_Laboratories_-_Orlando_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __FA40755_____ Sample matrix: _____Soil_____
No. of Samples: _____7_____
Field blank No.: _____FA40755-5_____
Equipment blank No.: ___-_____
Trip blank No.: _____-_____
Field duplicate No.: _____FA40755-2/FA40755-3_____

__X____ Data Completeness
__X____ Holding Times
__N/A__ GC/MS Tuning
__N/A__ Internal Standard Performance
__X____ Blanks
__X____ Surrogate Recoveries
__X____ Matrix Spike/Matrix Spike Duplicate
___X__ Laboratory Control Spikes
___X__ Field Duplicates
___X__ Calibrations
___X__ Compound Identifications
___X__ Compound Quantitation
___X__ Quantitation Limits

Overall Comments:
_Volatiles_by_GC_by_Method_MADEP_VPH,_REV_1.1._____

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Infante
Date:_____February_17,_2017_____

All criteria were met __x___
Criteria were not met and/or see below _____

I. DATA COMPLETNESS
A. Data Package:

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

B. Other Discrepancies:

All criteria were met ___X___
Criteria were not met and/or see below _____

HOLDING TIMES
The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples analyzed within method recommended holding time. Sample preservation within the required criteria.				

Criteria

Preservation:

Samples analyzed with ambient purge temperature: Samples must be acidified to a pH of 2.0 or less at the time of collection.
Samples analyzed with heated purge temperature: Samples must be treated to a pH of 11.0 or greater at the time of collection.
Methanol preservation of soil/sediment samples is mandatory. Methanol (purge-and-trap grade) must be added to the sample vial before or immediately after sample collection. In lieu of the in-field preservation of samples with methanol, soil samples may be obtained in specially-designed air tight sampling devices, provided that the samples are extruded and preserved in methanol within 48 hours of collection.

Holding times:

Aqueous samples using ambient or heated purge - analyze within 14 days.
Soil/sediment samples - analysis within 28 days.

Cooler temperature (Criteria: 4 ± 2 °C):_____3.5°C_____

Actions: Qualify positive results/non-detects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).
If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).
If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

All criteria were met ___X___
Criteria were not met and/or see below _____

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:___01/13/17_____

Dates of initial calibration verification:__01/13/17_

Instrument ID numbers:_____HP5890_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and initial calibration verification meet method specific requirements				

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C5-C8 Aliphatic Hydrocarbons and C9-C12 Aliphatic Hydrocarbons using the FID chromatogram. Calculate the collective CF for the C9-C10 Aromatic Hydrocarbons using the PID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples, and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and

percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects.
If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____01/13/17_____

Dates of continuing calibration verification:__01/31/17;_02/06/17___

Dates of final calibration verification:_02/01/17;_02/07/17_____

Instrument ID numbers:_____HP5890_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, **%D**, r	SAMPLES AFFECTED
02/06/17	cc4115-4	C5 – C8 Aliphatics	-29.6	FA40755-4

Note: Continuing and final calibration verification meets method specific requirements except in the cases described in this document. The % difference for VPH in the C5-C8 aliphatic hydrocarbon retention time window in the continuing and ending calibration verification was outside the method performance criteria. Results are qualified as estimated in affected samples.

A separate worksheet should be filled for each initial curve

All criteria were met ___X___
Criteria were not met and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data. A Laboratory Method Blank must be run after samples suspected of being highly contaminated to determine if sample carryover has occurred.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

_METHOD_BLANKS_MEET_THE_METHOD_SPECIFIC_CRITERIA_____

Note:

Field/Trip/Equipment

A methanol trip blank or acidified reagent water trip blank **should** continually accompany each soil/sediment sample or water sample batch, respectively, during sampling, storage, and analysis.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

_NO_TRIP/EQUIPMENT_BLANKS_ASSOCIATED_WITH_THIS_DATA_PACKAGE._____

_NO_TARGET_ANALYTES_DETECTED_IN_FIELD_BLANK_ANALYZED._____

Note:

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.
If the concentration is $\geq$ SQL but < AL, report the compound as not detected (U) at the reported concentration.
If the concentration is > AL, report the concentration unqualified.

All criteria were met __X___
Criteria were not met and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND	ACTION
	BFB	

_SURROGATE_STANDARD_RECOVERIES_WITHIN_LABORATORY_CONTROL_____
_LIMITS._SURROGATE_RECOVERIES_WERE_CORRECTED_FOR_ACTUAL_SPIKE__
_AMOUNT._____

QC Limits* (Aqueous)
_____LL_to_UL___ _70_to_130_ ___to_____ ___to_____
QC Limits* (Solid)
_____LL_to_UL___ _70_to_130_ ___to_____ ___to_____

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 70% or more than 130%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

(1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
(2) Percent moisture of associated soil/sediment sample is >25% and surrogate recovery is >10%; or
(3) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

All criteria were met _____
Criteria were not met and/or see below __X___

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- **Matrix duplicate** - Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 70 - 130% of the true value. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range), but must be noted in the narrative if <30%.

MS/MSD Recoveries and Precision Criteria

Sample ID:_FA40755-4_MS/MSD_____ Matrix/Level:_Soil_____

List the %Rs, RPD of the compounds which do not meet the QC criteria.

The QC reported here applies to the following samples: Method: **MADEP VPH REV 1.1**
FA40755-1, FA40755-2, FA40755-3, FA40755-4

Compound	FA40755-4 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
C5- C8 Aliphatics (Unadj.)	ND		36100	21000	58*	36100	20800	58*	1	70-130/50
C9- C12 Aliphatics (Unadj.)	ND		30100	10000	33*	30100	9970	33*	0	70-130/50
C9- C10 Aromatics (Unadj.)	ND		18100	5490	30*	18100	5080	28*	8	70-130/50

* Outside laboratory control limits.

Note: MS/MSD % recovery and RPD within laboratory control limits except for the cases described in this document. Results qualified as estimated (J or UJ) is sample FA40755-4.

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRATION SAMPLE	MS	MSD	%RPD	ACTION

Criteria: None specified, use %RSD $\leq$ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J).
If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

All criteria were met __X___
Criteria were not met and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT	ACTION

__LCS_RECOVERY_WITHIN_LABORATORY_CONTROL_LIMTS_FOR_BOTH_LIQUID_
__AND_SOLID_MATRICES._____
_____
_____
_____

Criteria:
* Refer to QAPP for specific criteria.
* The spike recovery must be between 70% and 130%. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range). If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative.

Actions:
Actions on LCS recovery should be based on both the number of compounds that are outside the %R criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.
If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.
If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? **Yes** or No.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

All criteria were met __X___
Criteria were not met and/or see below _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs:__FA40755-3/FA40755-3DUP_ Matrix:___Soil_____
Sample IDs:__ FA40755-2/FA40755-3_____ Matrix:___Soil_____
Sample IDs:__FA40908-6/FA40755-6DUP_ Matrix:___Aqueous____

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Field/laboratory duplicate analyzed with this data package. RPD within laboratory and validation guidance document criteria (± 50 %) for analytes detected above reporting limits.					

Criteria:

The project QAPP should be reviewed for project-specific information.
RPD ± 30% for aqueous samples, RPD ± 50 % for solid samples if results are ≥ SQL.
If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

SQL = soil quantitation limit

Actions:

If both the sample and the duplicate results are nondetects (ND), the RPD is not calculable (NC). No action is needed.

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.

If one sample result is not detected and the other is ≥ 5x the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

All criteria were met __X___
Criteria were not met and/or see below _____

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

1. Verify that the target analytes were within the retention time windows.

   - Retention time windows must be re-established for each Target VPH Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
   - Coelution of the m- and p- xylene isomers is permissible.
   - All surrogates must be adequately resolved from individual Target Analytes included in the VPH Component Standard.
   - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
   - The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

   Note: Target analytes were within the retention time window.

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

All criteria were met __X___
Criteria were not met and/or see below _____

XII. QUANTITATION LIMITS AND SAMPLE RESULTS

The sample quantitation evaluation is to verify laboratory quantitation results.

1. In the space below, please show a minimum of one sample calculation:

FID

Computer printout

PID

Computer printout

2. If requested, verify that the results were above the laboratory method detection limit (MDLs).

3. If dilutions performed, were the SQLs elevated accordingly by the laboratory? List the affected samples and dilution factor in the table below.

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

If dilution was not performed and the results were above the concentration range, estimate results (J) for the affected compounds. List the affected samples/compounds:

EXECUTIVE NARRATIVE

SDG No:	FA40755	Laboratory:	Accutest, Florida
Analysis:	SW846-8260C	Number of Samples:	7
Location:	BMSMC – Humacao, PR		

SUMMARY: Seven (7) samples were analyzed for volatile organic compounds (VOA Special List) by method SW846-8260C. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Critical issues: **None**
Major: **None**
Minor: **None**

Critical findings: **None**
Major findings: **None**
Minor findings:

1. Initial calibration, initial calibration verification, and continuing calibration verification within the method and validation guidance document required performance criteria except for the cases described in the Data Review Worksheet. Closing calibration check verification included in data package.

Results for 1,4-Dioxane qualified as estimated (J or UJ) in sample FA40755-5.

2. MS/MSD % recoveries and RPD within laboratory control limits except in the cases described in the Data Review Worksheet. Anlytes not meeting the MS/MSD % recovery criteria were qualified as estimated (J or UJ) in sample FA40755-4.

Analytes not meeting either the MS or MSD % recovery criteria are not qualified, professional judgment. % recovery criteria within generally acceptable laboratory control limits.

No qualification made based on RPD result, professional judgment.

3. Methylene chloride found on method blank. No action taken, professional judgment. Methylene chloride is a common laboratory contaminant and was detected below the reporting limit. Laboratory qualified positive results with a B qualifier.

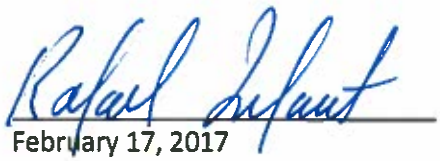
4. DMCs recoveries within the laboratory required control limits and within the guidance document performance criteria (80 – 120) except for the cases described in the Data Review Worksheet. Other non-deuterated surrogates added to the samples within laboratory control limits recovered within laboratory control limits except for the cases described in the Data Review Worksheet.

No action taken, professional judgment. Outside control limits due to matrix interferences, confirmation run performed.

5. Internal standard area within laboratory control limits except for the cases described in the Data Review Worksheet. No action taken, professional judgment. Internal area outside laboratory control limits due to matrix interferences, confirmed by re-analysis.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: 

Date: February 17, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA40755-1
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	57	ug/kg	1.0	-	U	Yes
Benzene	5.7	ug/kg	1.0	-	U	Yes
Benzyl Chloride	5.7	ug/kg	1.0	-	U	Yes
Bromochloromethane	5.7	ug/kg	1.0	-	U	Yes
Bromodichloromethane	5.7	ug/kg	1.0	-	U	Yes
Bromoform	5.7	ug/kg	1.0	-	U	Yes
2-Butanone (MEK)	28	ug/kg	1.0	-	U	Yes
n-Butyl benzene	5.7	ug/kg	1.0	-	U	Yes
sec-Butyl benzene	5.7	ug/kg	1.0	-	U	Yes
Carbon disulfide	5.7	ug/kg	1.0	-	U	Yes
Carbon tetrachloride	5.7	ug/kg	1.0	-	U	Yes
Chlorobenzene	5.7	ug/kg	1.0	-	U	Yes
Chloroethane	5.7	ug/kg	1.0	-	U	Yes
Chloroform	5.7	ug/kg	1.0	-	U	Yes
o-Chlorotoluene	5.7	ug/kg	1.0	-	U	Yes
Cyclohexane	5.7	ug/kg	1.0	-	U	Yes
Dibromochloromethane	5.7	ug/kg	1.0	-	U	Yes
1,2-Dibromo-3-chloropropane	5.7	ug/kg	1.0	-	U	Yes
1,2-Dibromoethane	5.7	ug/kg	1.0	-	U	Yes
Dichlorodifluoromethane	5.7	ug/kg	1.0	-	U	Yes
1,2-Dichlorobenzene	5.7	ug/kg	1.0	-	U	Yes
1,3-Dichlorobenzene	5.7	ug/kg	1.0	-	U	Yes
1,4-Dichlorobenzene	5.7	ug/kg	1.0	-	U	Yes
1,1-Dichloroethane	5.7	ug/kg	1.0	-	U	Yes

1,2-Dichloroethane	5.7	ug/kg	1.0	-	U	Yes
1,1-Dichloroethene	5.7	ug/kg	1.0	-	U	Yes
cis-1,2-Dichloroethene	5.7	ug/kg	1.0	-	U	Yes
trans-1,2-Dichloroethene	5.7	ug/kg	1.0	-	U	Yes
1,2-Dichloropropane	5.7	ug/kg	1.0	-	U	Yes
cis-1,3-Dichloropropene	5.7	ug/kg	1.0	-	U	Yes
trans-1,3-Dichloropropene	5.7	ug/kg	1.0	-	U	Yes
1,4-Dioxane	230	ug/kg	1.0	-	U	Yes
Ethylbenzene	5.7	ug/kg	1.0	-	U	Yes
Freon 113	5.7	ug/kg	1.0	-	U	Yes
2-Hexanone	28	ug/kg	1.0	-	U	Yes
Isopropylbenzene	5.7	ug/kg	1.0	-	U	Yes
Methyl Acetate	28	ug/kg	1.0	-	U	Yes
Methyl Bromide	5.7	ug/kg	1.0	-	U	Yes
Methyl Chloride	5.7	ug/kg	1.0	-	U	Yes
Methylcyclohexane	5.7	ug/kg	1.0	-	U	Yes
Methylene chloride	5.7	ug/kg	1.0	-	U	Yes
4-Methyl-2-pentanone(MIBK)	28	ug/kg	1.0	-	U	Yes
Methyl Tert Butyl Ether	5.7	ug/kg	1.0	-	U	Yes
n-propylbenzene	5.7	ug/kg	1.0	-	U	Yes
Styrene	5.7	ug/kg	1.0	-	U	Yes
Tert-Amyl Alcohol	57	ug/kg	1.0	-	U	Yes
Tert-Butyl Alcohol	57	ug/kg	1.0	-	U	Yes
1,1,2,2-Tetrachloroethane	5.7	ug/kg	1.0	-	U	Yes
Tetrachloroethene	5.7	ug/kg	1.0	-	U	Yes
Tetrahydrofuran	11	ug/kg	1.0	-	U	Yes
Toluene	5.7	ug/kg	1.0	-	U	Yes
1,2,3-Trichlorobenzene	5.7	ug/kg	1.0	-	U	Yes
1,2,4-Trichlorobenzene	5.7	ug/kg	1.0	-	U	Yes
1,1,1-Trichloroethane	5.7	ug/kg	1.0	-	U	Yes
1,1,2-Trichloroethane	5.7	ug/kg	1.0	-	U	Yes
Trichloroethene	5.7	ug/kg	1.0	-	U	Yes
Trichlorofluoromethane	5.7	ug/kg	1.0	-	U	Yes

1,2,4-Trimethylbenzene	5.7	ug/kg	1.0	-	U	Yes
1,3,5-Trimethylbenzene	5.7	ug/kg	1.0	-	U	Yes
Vinyl chloride	5.7	ug/kg	1.0	-	U	Yes
m,p-Xylene	11	ug/kg	1.0	-	U	Yes
o-Xylene	5.7	ug/kg	1.0	-	U	Yes
Xylene (total)	17	ug/kg	1.0	-	U	Yes

Sample ID: FA40755-2
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	65	ug/kg	1.0	-	U	Yes
Benzene	6.5	ug/kg	1.0	-	U	Yes
Benzyl Chloride	6.5	ug/kg	1.0	-	U	Yes
Bromochloromethane	6.5	ug/kg	1.0	-	U	Yes
Bromodichloromethane	6.5	ug/kg	1.0	-	U	Yes
Bromoform	6.5	ug/kg	1.0	-	U	Yes
2-Butanone (MEK)	33	ug/kg	1.0	-	U	Yes
n-Butyl benzene	6.5	ug/kg	1.0	-	U	Yes
sec-Butyl benzene	6.5	ug/kg	1.0	-	U	Yes
Carbon disulfide	6.5	ug/kg	1.0	-	U	Yes
Carbon tetrachloride	6.5	ug/kg	1.0	-	U	Yes
Chlorobenzene	6.5	ug/kg	1.0	-	U	Yes
Chloroethane	6.5	ug/kg	1.0	-	U	Yes
Chloroform	6.5	ug/kg	1.0	-	U	Yes
o-Chlorotoluene	6.5	ug/kg	1.0	-	U	Yes
Cyclohexane	6.5	ug/kg	1.0	-	U	Yes
Dibromochloromethane	6.5	ug/kg	1.0	-	U	Yes
1,2-Dibromo-3-chloropropane	6.5	ug/kg	1.0	-	U	Yes

1,2-Dibromoethane	6.5	ug/kg	1.0	-	U	Yes
Dichlorodifluoromethane	6.5	ug/kg	1.0	-	U	Yes
1,2-Dichlorobenzene	6.5	ug/kg	1.0	-	U	Yes
1,3-Dichlorobenzene	6.5	ug/kg	1.0	-	U	Yes
1,4-Dichlorobenzene	6.5	ug/kg	1.0	-	U	Yes
1,1-Dichloroethane	6.5	ug/kg	1.0	-	U	Yes
1,2-Dichloroethane	6.5	ug/kg	1.0	-	U	Yes
1,1-Dichloroethene	6.5	ug/kg	1.0	-	U	Yes
cis-1,2-Dichloroethene	6.5	ug/kg	1.0	-	U	Yes
trans-1,2-Dichloroethene	6.5	ug/kg	1.0	-	U	Yes
1,2-Dichloropropane	6.5	ug/kg	1.0	-	U	Yes
cis-1,3-Dichloropropene	6.5	ug/kg	1.0	-	U	Yes
trans-1,3-Dichloropropene	6.5	ug/kg	1.0	-	U	Yes
1,4-Dioxane	260	ug/kg	1.0	-	U	Yes
Ethylbenzene	6.5	ug/kg	1.0	-	U	Yes
Freon 113	6.5	ug/kg	1.0	-	U	Yes
2-Hexanone	33	ug/kg	1.0	-	U	Yes
Isopropylbenzene	6.5	ug/kg	1.0	-	U	Yes
Methyl Acetate	33	ug/kg	1.0	-	U	Yes
Methyl Bromide	6.5	ug/kg	1.0	-	U	Yes
Methyl Chloride	6.5	ug/kg	1.0	-	U	Yes
Methylcyclohexane	6.5	ug/kg	1.0	-	U	Yes
Methylene chloride	13	ug/kg	1.0	-	U	Yes
4-Methyl-2-pentanone(MIBK)	33	ug/kg	1.0	-	U	Yes
Methyl Tert Butyl Ether	6.5	ug/kg	1.0	-	U	Yes
n-propylbenzene	6.5	ug/kg	1.0	-	U	Yes
Styrene	6.5	ug/kg	1.0	-	U	Yes
Tert-Amyl Alcohol	65	ug/kg	1.0	-	U	Yes
Tert-Butyl Alcohol	65	ug/kg	1.0	-	U	Yes
1,1,2,2-Tetrachloroethane	6.5	ug/kg	1.0	-	U	Yes
Tetrachloroethene	6.5	ug/kg	1.0	-	U	Yes
Tetrahydrofuran	13	ug/kg	1.0	-	U	Yes
Toluene	6.5	ug/kg	1.0	-	U	Yes

1,2,3-Trichlorobenzene	6.5	ug/kg	1.0	-	U	Yes
1,2,4-Trichlorobenzene	6.5	ug/kg	1.0	-	U	Yes
1,1,1-Trichloroethane	6.5	ug/kg	1.0	-	U	Yes
1,1,2-Trichloroethane	6.5	ug/kg	1.0	-	U	Yes
Trichloroethene	6.5	ug/kg	1.0	-	U	Yes
Trichlorofluoromethane	6.5	ug/kg	1.0	-	U	Yes
1,2,4-Trimethylbenzene	6.5	ug/kg	1.0	-	U	Yes
1,3,5-Trimethylbenzene	6.5	ug/kg	1.0	-	U	Yes
Vinyl chloride	6.5	ug/kg	1.0	-	U	Yes
m,p-Xylene	13	ug/kg	1.0	-	U	Yes
o-Xylene	6.5	ug/kg	1.0	-	U	Yes
Xylene (total)	20	ug/kg	1.0	-	U	Yes

Sample ID: FA40755-3
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	79	ug/kg	1.0	-	U	Yes
Benzene	7.9	ug/kg	1.0	-	U	Yes
Benzyl Chloride	7.9	ug/kg	1.0	-	U	Yes
Bromochloromethane	7.9	ug/kg	1.0	-	U	Yes
Bromodichloromethane	7.9	ug/kg	1.0	-	U	Yes
Bromoform	7.9	ug/kg	1.0	-	U	Yes
2-Butanone (MEK)	39	ug/kg	1.0	-	U	Yes
n-Butyl benzene	7.9	ug/kg	1.0	-	U	Yes
sec-Butyl benzene	7.9	ug/kg	1.0	-	U	Yes
Carbon disulfide	7.9	ug/kg	1.0	-	U	Yes
Carbon tetrachloride	7.9	ug/kg	1.0	-	U	Yes

Chlorobenzene	7.9	ug/kg	1.0	-	U	Yes
Chloroethane	7.9	ug/kg	1.0	-	U	Yes
Chloroform	7.9	ug/kg	1.0	-	U	Yes
o-Chlorotoluene	7.9	ug/kg	1.0	-	U	Yes
Cyclohexane	7.9	ug/kg	1.0	-	U	Yes
Dibromochloromethane	7.9	ug/kg	1.0	-	U	Yes
1,2-Dibromo-3-chloropropane	7.9	ug/kg	1.0	-	U	Yes
1,2-Dibromoethane	7.9	ug/kg	1.0	-	U	Yes
Dichlorodifluoromethane	7.9	ug/kg	1.0	-	U	Yes
1,2-Dichlorobenzene	7.9	ug/kg	1.0	-	U	Yes
1,3-Dichlorobenzene	7.9	ug/kg	1.0	-	U	Yes
1,4-Dichlorobenzene	7.9	ug/kg	1.0	-	U	Yes
1,1-Dichloroethane	7.9	ug/kg	1.0	-	U	Yes
1,2-Dichloroethane	7.9	ug/kg	1.0	-	U	Yes
1,1-Dichloroethene	7.9	ug/kg	1.0	-	U	Yes
cis-1,2-Dichloroethene	7.9	ug/kg	1.0	-	U	Yes
trans-1,2-Dichloroethene	7.9	ug/kg	1.0	-	U	Yes
1,2-Dichloropropane	7.9	ug/kg	1.0	-	U	Yes
cis-1,3-Dichloropropene	7.9	ug/kg	1.0	-	U	Yes
trans-1,3-Dichloropropene	7.9	ug/kg	1.0	-	U	Yes
1,4-Dioxane	320	ug/kg	1.0	-	U	Yes
Ethylbenzene	7.9	ug/kg	1.0	-	U	Yes
Freon 113	7.9	ug/kg	1.0	-	U	Yes
2-Hexanone	39	ug/kg	1.0	-	U	Yes
Isopropylbenzene	7.9	ug/kg	1.0	-	U	Yes
Methyl Acetate	39	ug/kg	1.0	-	U	Yes
Methyl Bromide	7.9	ug/kg	1.0	-	U	Yes
Methyl Chloride	7.9	ug/kg	1.0	-	U	Yes
Methylcyclohexane	7.9	ug/kg	1.0	-	U	Yes
Methylene chloride	16	ug/kg	1.0	-	U	Yes
4-Methyl-2-pentanone(MIBK)	39	ug/kg	1.0	-	U	Yes
Methyl Tert Butyl Ether	7.9	ug/kg	1.0	-	U	Yes
n-propylbenzene	7.9	ug/kg	1.0	-	U	Yes

Styrene	7.9	ug/kg	1.0	-	U	Yes
Tert-Amyl Alcohol	79	ug/kg	1.0	-	U	Yes
Tert-Butyl Alcohol	79	ug/kg	1.0	-	U	Yes
1,1,2,2-Tetrachloroethane	7.9	ug/kg	1.0	-	U	Yes
Tetrachloroethene	7.9	ug/kg	1.0	-	U	Yes
Tetrahydrofuran	16	ug/kg	1.0	-	U	Yes
Toluene	7.9	ug/kg	1.0	-	U	Yes
1,2,3-Trichlorobenzene	7.9	ug/kg	1.0	-	U	Yes
1,2,4-Trichlorobenzene	7.9	ug/kg	1.0	-	U	Yes
1,1,1-Trichloroethane	7.9	ug/kg	1.0	-	U	Yes
1,1,2-Trichloroethane	7.9	ug/kg	1.0	-	U	Yes
Trichloroethene	7.9	ug/kg	1.0	-	U	Yes
Trichlorofluoromethane	7.9	ug/kg	1.0	-	U	Yes
1,2,4-Trimethylbenzene	7.9	ug/kg	1.0	-	U	Yes
1,3,5-Trimethylbenzene	7.9	ug/kg	1.0	-	U	Yes
Vinyl chloride	7.9	ug/kg	1.0	-	U	Yes
m,p-Xylene	16	ug/kg	1.0	-	U	Yes
o-Xylene	7.9	ug/kg	1.0	-	U	Yes
Xylene (total)	24	ug/kg	1.0	-	U	Yes

Sample ID: FA40755-4
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	67	ug/kg	1.0	-	U	Yes
Benzene	6.7	ug/kg	1.0	-	U	Yes
Benzyl Chloride	6.7	ug/kg	1.0	-	UJ ✓ ✓	Yes
Bromochloromethane	6.7	ug/kg	1.0	-	U	Yes
Bromodichloromethane	6.7	ug/kg	1.0	-	U	Yes

Bromoform	6.7	ug/kg	1.0	-	U	Yes
2-Butanone (MEK)	33	ug/kg	1.0	-	U	Yes
n-Butyl benzene	6.7	ug/kg	1.0	-	UJ	Yes
sec-Butyl benzene	6.7	ug/kg	1.0	-	UJ	Yes
Carbon disulfide	6.7	ug/kg	1.0	-	U	Yes
Carbon tetrachloride	6.7	ug/kg	1.0	-	U	Yes
Chlorobenzene	6.7	ug/kg	1.0	-	U	Yes
Chloroethane	6.7	ug/kg	1.0	-	U	Yes
Chloroform	6.7	ug/kg	1.0	-	U	Yes
o-Chlorotoluene	6.7	ug/kg	1.0	-	U	Yes
Cyclohexane	6.7	ug/kg	1.0	-	UJ	Yes
Dibromochloromethane	6.7	ug/kg	1.0	-	U	Yes
1,2-Dibromo-3-chloropropane	6.7	ug/kg	1.0	-	U	Yes
1,2-Dibromoethane	6.7	ug/kg	1.0	-	U	Yes
Dichlorodifluoromethane	6.7	ug/kg	1.0	-	U	Yes
1,2-Dichlorobenzene	6.7	ug/kg	1.0	-	UJ	Yes
1,3-Dichlorobenzene	6.7	ug/kg	1.0	-	U	Yes
1,4-Dichlorobenzene	6.7	ug/kg	1.0	-	U	Yes
1,1-Dichloroethane	6.7	ug/kg	1.0	-	U	Yes
1,2-Dichloroethane	6.7	ug/kg	1.0	-	U	Yes
1,1-Dichloroethene	6.7	ug/kg	1.0	-	U	Yes
cis-1,2-Dichloroethene	6.7	ug/kg	1.0	-	U	Yes
trans-1,2-Dichloroethene	6.7	ug/kg	1.0	-	U	Yes
1,2-Dichloropropane	6.7	ug/kg	1.0	-	U	Yes
cis-1,3-Dichloropropene	6.7	ug/kg	1.0	-	U	Yes
trans-1,3-Dichloropropene	6.7	ug/kg	1.0	-	U	Yes
1,4-Dioxane	270	ug/kg	1.0	-	U	Yes
Ethylbenzene	6.7	ug/kg	1.0	-	U	Yes
Freon 113	6.7	ug/kg	1.0	-	U	Yes
2-Hexanone	33	ug/kg	1.0	-	U	Yes
Isopropylbenzene	6.7	ug/kg	1.0	-	U	Yes
Methyl Acetate	33	ug/kg	1.0	-	UJ	Yes
Methyl Bromide	6.7	ug/kg	1.0	-	U	Yes

Methyl Chloride	6.7	ug/kg	1.0	-	U	Yes
Methylcyclohexane	6.7	ug/kg	1.0	-	UJ ✓ ✓	Yes
Methylene chloride	5.7	ug/kg	1.0	JB	JB	Yes
4-Methyl-2-pentanone(MIBK)	33	ug/kg	1.0	-	U	Yes
Methyl Tert Butyl Ether	6.7	ug/kg	1.0	-	U	Yes
n-propylbenzene	6.7	ug/kg	1.0	-	U	Yes
Styrene	6.7	ug/kg	1.0	-	U	Yes
Tert-Amyl Alcohol	67	ug/kg	1.0	-	U	Yes
Tert-Butyl Alcohol	67	ug/kg	1.0	-	U	Yes
1,1,2,2-Tetrachloroethane	6.7	ug/kg	1.0	-	U	Yes
Tetrachloroethene	6.7	ug/kg	1.0	-	U	Yes
Tetrahydrofuran	13	ug/kg	1.0	-	UJ ✓ ✓	Yes
Toluene	6.7	ug/kg	1.0	-	U	Yes
1,2,3-Trichlorobenzene	6.7	ug/kg	1.0	-	UJ ✓ ✓	Yes
1,2,4-Trichlorobenzene	6.7	ug/kg	1.0	-	UJ ✓ ✓	Yes
1,1,1-Trichloroethane	6.7	ug/kg	1.0	-	U	Yes
1,1,2-Trichloroethane	6.7	ug/kg	1.0	-	U	Yes
Trichloroethene	6.7	ug/kg	1.0	-	U	Yes
Trichlorofluoromethane	6.7	ug/kg	1.0	-	U	Yes
1,2,4-Trimethylbenzene	6.7	ug/kg	1.0	-	U	Yes
1,3,5-Trimethylbenzene	6.7	ug/kg	1.0	-	U	Yes
Vinyl chloride	6.7	ug/kg	1.0	-	U	Yes
m,p-Xylene	13	ug/kg	1.0	-	U	Yes
o-Xylene	6.7	ug/kg	1.0	-	U	Yes
Xylene (total)	20	ug/kg	1.0	-	U	Yes

Sample ID: FA40755-5
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	25	ug/l	1.0	-	U	Yes
Benzene	1.0	ug/l	1.0	-	U	Yes
Benzyl Chloride	2.0	ug/l	1.0	-	U	Yes
Bromochloromethane	1.0	ug/l	1.0	-	U	Yes
Bromodichloromethane	1.0	ug/l	1.0	-	U	Yes
Bromoform	1.0	ug/l	1.0	-	U	Yes
2-Butanone (MEK)	5.0	ug/l	1.0	-	U	Yes
n-Butyl benzene	1.0	ug/l	1.0	-	U	Yes
sec-Butyl benzene	1.0	ug/l	1.0	-	U	Yes
Carbon disulfide	2.0	ug/l	1.0	-	U	Yes
Carbon tetrachloride	1.0	ug/l	1.0	-	U	Yes
Chlorobenzene	1.0	ug/l	1.0	-	U	Yes
Chloroethane	2.0	ug/l	1.0	-	U	Yes
Chloroform	1.0	ug/l	1.0	-	U	Yes
o-Chlorotoluene	1.0	ug/l	1.0	-	U	Yes
Cyclohexane	1.0	ug/l	1.0	-	U	Yes
Dibromochloromethane	1.0	ug/l	1.0	-	U	Yes
1,2-Dibromo-3-chloropropane	5.0	ug/l	1.0	-	U	Yes
1,2-Dibromoethane	2.0	ug/l	1.0	-	U	Yes
Dichlorodifluoromethane	2.0	ug/l	1.0	-	U	Yes
1,2-Dichlorobenzene	1.0	ug/l	1.0	-	U	Yes
1,3-Dichlorobenzene	1.0	ug/l	1.0	-	U	Yes
1,4-Dichlorobenzene	1.0	ug/l	1.0	-	U	Yes
1,1-Dichloroethane	1.0	ug/l	1.0	-	U	Yes
1,2-Dichloroethane	1.0	ug/l	1.0	-	U	Yes
1,1-Dichloroethene	1.0	ug/l	1.0	-	U	Yes

cis-1,2-Dichloroethene	1.0	ug/l	1.0	-	U	Yes
trans-1,2-Dichloroethene	1.0	ug/l	1.0	-	U	Yes
1,2-Dichloropropane	1.0	ug/l	1.0	-	U	Yes
cis-1,3-Dichloropropene	1.0	ug/l	1.0	-	U	Yes
trans-1,3-Dichloropropene	1.0	ug/l	1.0	-	U	Yes
1,4-Dioxane	200	ug/l	1.0	-	UJ ✓	Yes
Ethylbenzene	1.0	ug/l	1.0	-	U	Yes
Freon 113	1.0	ug/l	1.0	-	U	Yes
2-Hexanone	10	ug/l	1.0	-	U	Yes
Isopropylbenzene	1.0	ug/l	1.0	-	U	Yes
Methyl Acetate	20	ug/l	1.0	-	U	Yes
Methyl Bromide	2.0	ug/l	1.0	-	U	Yes
Methyl Chloride	2.0	ug/l	1.0	-	U	Yes
Methylcyclohexane	1.0	ug/l	1.0	-	U	Yes
Methylene chloride	5.0	ug/l	1.0	-	U	Yes
4-Methyl-2-pentanone(MIBK)	5.0	ug/l	1.0	-	U	Yes
Methyl Tert Butyl Ether	1.0	ug/l	1.0	-	U	Yes
n-propylbenzene	1.0	ug/l	1.0	-	U	Yes
Styrene	1.0	ug/l	1.0	-	U	Yes
Tert-Amyl Alcohol	20	ug/l	1.0	-	U	Yes
Tert-Butyl Alcohol	20	ug/l	1.0	-	U	Yes
1,1,2,2-Tetrachloroethane	1.0	ug/l	1.0	-	U	Yes
Tetrachloroethene	1.0	ug/l	1.0	-	U	Yes
Tetrahydrofuran	5.0	ug/l	1.0	-	U	Yes
Toluene	1.0	ug/l	1.0	-	U	Yes
1,2,3-Trichlorobenzene	2.0	ug/l	1.0	-	U	Yes
1,2,4-Trichlorobenzene	2.0	ug/l	1.0	-	U	Yes
1,1,1-Trichloroethane	1.0	ug/l	1.0	-	U	Yes
1,1,2-Trichloroethane	1.0	ug/l	1.0	-	U	Yes
Trichloroethene	1.0	ug/l	1.0	-	U	Yes
Trichlorofluoromethane	2.0	ug/l	1.0	-	U	Yes
1,2,4-Trimethylbenzene	1.0	ug/l	1.0	-	U	Yes
1,3,5-Trimethylbenzene	1.0	ug/l	1.0	-	U	Yes

Vinyl chloride	1.0	ug/l	1.0	-	U	Yes
m,p-Xylene	2.0	ug/l	1.0	-	U	Yes
o-Xylene	1.0	ug/l	1.0	-	U	Yes
Xylene (total)	3.0	ug/l	1.0	-	U	Yes

Sample ID: FA40755-4MS
Sample location: BMSMC Building 5 Area
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	257	ug/kg	1.0	-	-	Yes
Benzene	54.1	ug/kg	1.0	-	-	Yes
Benzyl Chloride	30.4	ug/kg	1.0	-	-	Yes
Bromochloromethane	55.7	ug/kg	1.0	-	-	Yes
Bromodichloromethane	61.0	ug/kg	1.0	-	-	Yes
Bromoform	59.4	ug/kg	1.0	-	-	Yes
2-Butanone (MEK)	257	ug/kg	1.0	-	-	Yes
n-Butyl benzene	40.2	ug/kg	1.0	-	-	Yes
sec-Butyl benzene	48.9	ug/kg	1.0	-	-	Yes
Carbon disulfide	53.5	ug/kg	1.0	-	-	Yes
Carbon tetrachloride	51.1	ug/kg	1.0	-	-	Yes
Chlorobenzene	62.7	ug/kg	1.0	-	-	Yes
Chloroethane	61.9	ug/kg	1.0	-	-	Yes
Chloroform	59.0	ug/kg	1.0	-	-	Yes
o-Chlorotoluene	66.8	ug/kg	1.0	-	-	Yes
Cyclohexane	33.3	ug/kg	1.0	-	-	Yes
Dibromochloromethane	73.1	ug/kg	1.0	-	-	Yes
1,2-Dibromo-3-chloropropane	60.9	ug/kg	1.0	-	-	Yes
1,2-Dibromoethane	70.2	ug/kg	1.0	-	-	Yes
Dichlorodifluoromethane	48.7	ug/kg	1.0	-	-	Yes

1,2-Dichlorobenzene	48.5	ug/kg	1.0	-	-	Yes
1,3-Dichlorobenzene	51.6	ug/kg	1.0	-	-	Yes
1,4-Dichlorobenzene	51.7	ug/kg	1.0	-	-	Yes
1,1-Dichloroethane	62.2	ug/kg	1.0	-	-	Yes
1,2-Dichloroethane	68.5	ug/kg	1.0	-	-	Yes
1,1-Dichloroethene	57.3	ug/kg	1.0	-	-	Yes
cis-1,2-Dichloroethene	48.3	ug/kg	1.0	-	-	Yes
trans-1,2-Dichloroethene	63.2	ug/kg	1.0	-	-	Yes
1,2-Dichloropropane	58.3	ug/kg	1.0	-	-	Yes
cis-1,3-Dichloropropene	45.3	ug/kg	1.0	-	-	Yes
trans-1,3-Dichloropropene	69.5	ug/kg	1.0	-	-	Yes
1,4-Dioxane	1800	ug/kg	1.0	-	-	Yes
Ethylbenzene	63.8	ug/kg	1.0	-	-	Yes
Freon 113	49.0	ug/kg	1.0	-	-	Yes
2-Hexanone	332	ug/kg	1.0	-	-	Yes
Isopropylbenzene	57.4	ug/kg	1.0	-	-	Yes
Methyl Acetate	188	ug/kg	1.0	-	-	Yes
Methyl Bromide	42.3	ug/kg	1.0	-	-	Yes
Methyl Chloride	51.5	ug/kg	1.0	-	-	Yes
Methylcyclohexane	29.6	ug/kg	1.0	-	-	Yes
Methylene chloride	68.4	ug/kg	1.0	-	-	Yes
4-Methyl-2-pentanone(MIBK)	413	ug/kg	1.0	-	-	Yes
Methyl Tert Butyl Ether	64.7	ug/kg	1.0	-	-	Yes
n-propylbenzene	66.3	ug/kg	1.0	-	-	Yes
Styrene	56.2	ug/kg	1.0	-	-	Yes
Tert-Amyl Alcohol	857	ug/kg	1.0	-	-	Yes
Tert-Butyl Alcohol	998	ug/kg	1.0	-	-	Yes
1,1,2,2-Tetrachloroethane	76.9	ug/kg	1.0	-	-	Yes
Tetrachloroethene	61.4	ug/kg	1.0	-	-	Yes
Tetrahydrofuran	24.9	ug/kg	1.0	-	-	Yes
Toluene	69.7	ug/kg	1.0	-	-	Yes
1,2,3-Trichlorobenzene	20.2	ug/kg	1.0	-	-	Yes
1,2,4-Trichlorobenzene	25.3	ug/kg	1.0	-	-	Yes

1,1,1-Trichloroethane	51.7	ug/kg	1.0	-	-	Yes
1,1,2-Trichloroethane	76.1	ug/kg	1.0	-	-	Yes
Trichloroethene	55.8	ug/kg	1.0	-	-	Yes
Trichlorofluoromethane	59.4	ug/kg	1.0	-	-	Yes
1,2,4-Trimethylbenzene	63.9	ug/kg	1.0	-	-	Yes
1,3,5-Trimethylbenzene	64.8	ug/kg	1.0	-	-	Yes
Vinyl chloride	50.6	ug/kg	1.0	-	-	Yes
m,p-Xylene	132	ug/kg	1.0	-	-	Yes
o-Xylene	64.5	ug/kg	1.0	-	-	Yes
Xylene (total)	197	ug/kg	1.0	-	-	Yes

Sample ID: FA40755-4MSD
Sample location: BMSMC, Humacao, PR
Sampling date: 1/26/2017
Matrix: Soil

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Acetone	248	ug/kg	1.0	-	-	Yes
Benzene	50.3	ug/kg	1.0	-	-	Yes
Benzyl Chloride	29.8	ug/kg	1.0	-	-	Yes
Bromochloromethane	52.5	ug/kg	1.0	-	-	Yes
Bromodichloromethane	58.6	ug/kg	1.0	-	-	Yes
Bromoform	48.0	ug/kg	1.0	-	-	Yes
2-Butanone (MEK)	238	ug/kg	1.0	-	-	Yes
n-Butyl benzene	35.6	ug/kg	1.0	-	-	Yes
sec-Butyl benzene	44.0	ug/kg	1.0	-	-	Yes
Carbon disulfide	46.9	ug/kg	1.0	-	-	Yes
Carbon tetrachloride	48.7	ug/kg	1.0	-	-	Yes
Chlorobenzene	50.5	ug/kg	1.0	-	-	Yes
Chloroethane	58.8	ug/kg	1.0	-	-	Yes
Chloroform	54.9	ug/kg	1.0	-	-	Yes

o-Chlorotoluene	62.2	ug/kg	1.0	-	-	Yes
Cyclohexane	36.3	ug/kg	1.0	-	-	Yes
Dibromochloromethane	56.8	ug/kg	1.0	-	-	Yes
1,2-Dibromo-3-chloropropane	58.0	ug/kg	1.0	-	-	Yes
1,2-Dibromoethane	57.3	ug/kg	1.0	-	-	Yes
Dichlorodifluoromethane	49.6	ug/kg	1.0	-	-	Yes
1,2-Dichlorobenzene	46.9	ug/kg	1.0	-	-	Yes
1,3-Dichlorobenzene	49.0	ug/kg	1.0	-	-	Yes
1,4-Dichlorobenzene	49.9	ug/kg	1.0	-	-	Yes
1,1-Dichloroethane	57.7	ug/kg	1.0	-	-	Yes
1,2-Dichloroethane	62.8	ug/kg	1.0	-	-	Yes
1,1-Dichloroethene	50.3	ug/kg	1.0	-	-	Yes
cis-1,2-Dichloroethene	60.8	ug/kg	1.0	-	-	Yes
trans-1,2-Dichloroethene	57.2	ug/kg	1.0	-	-	Yes
1,2-Dichloropropane	54.3	ug/kg	1.0	-	-	Yes
cis-1,3-Dichloropropene	49.5	ug/kg	1.0	-	-	Yes
trans-1,3-Dichloropropene	57.3	ug/kg	1.0	-	-	Yes
1,4-Dioxane	1190	ug/kg	1.0	-	-	Yes
Ethylbenzene	50.7	ug/kg	1.0	-	-	Yes
Freon 113	44.2	ug/kg	1.0	-	-	Yes
2-Hexanone	255	ug/kg	1.0	-	-	Yes
Isopropylbenzene	45.9	ug/kg	1.0	-	-	Yes
Methyl Acetate	138	ug/kg	1.0	-	-	Yes
Methyl Bromide	41.3	ug/kg	1.0	-	-	Yes
Methyl Chloride	50.6	ug/kg	1.0	-	-	Yes
Methylcyclohexane	28.0	ug/kg	1.0	-	-	Yes
Methylene chloride	59.5	ug/kg	1.0	-	-	Yes
4-Methyl-2-pentanone(MIBK)	322	ug/kg	1.0	-	-	Yes
Methyl Tert Butyl Ether	65.6	ug/kg	1.0	-	-	Yes
n-propylbenzene	60.4	ug/kg	1.0	-	-	Yes
Styrene	46.6	ug/kg	1.0	-	-	Yes
Tert-Amyl Alcohol	632	ug/kg	1.0	-	-	Yes
Tert-Butyl Alcohol	715	ug/kg	1.0	-	-	Yes

1,1,2,2-Tetrachloroethane	68.5	ug/kg	1.0	-	-	Yes
Tetrachloroethene	48.0	ug/kg	1.0	-	-	Yes
Tetrahydrofuran	22.1	ug/kg	1.0	-	-	Yes
Toluene	52.8	ug/kg	1.0	-	-	Yes
1,2,3-Trichlorobenzene	20.6	ug/kg	1.0	-	-	Yes
1,2,4-Trichlorobenzene	24.3	ug/kg	1.0	-	-	Yes
1,1,1-Trichloroethane	50.7	ug/kg	1.0	-	-	Yes
1,1,2-Trichloroethane	59.5	ug/kg	1.0	-	-	Yes
Trichloroethene	50.3	ug/kg	1.0	-	-	Yes
Trichlorofluoromethane	53.8	ug/kg	1.0	-	-	Yes
1,2,4-Trimethylbenzene	58.0	ug/kg	1.0	-	-	Yes
1,3,5-Trimethylbenzene	58.1	ug/kg	1.0	-	-	Yes
Vinyl chloride	51.2	ug/kg	1.0	-	-	Yes
m,p-Xylene	105	ug/kg	1.0	-	-	Yes
o-Xylene	51.1	ug/kg	1.0	-	-	Yes
Xylene (total)	156	ug/kg	1.0	-	-	Yes

Project Number:_FA40755_____
Date:_____January 26,_2017_____
Shipping date:__January_26,_2017_____
EPA Region:_____2_____

REVIEW OF VOLATILE ORGANIC PACKAGE
Low/Medium Volatile Data Validation

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA **Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation**. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) __Accutest_-_Orlando_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: ____FA40755_____ Sample matrix: _____Soil_____
No. of Samples: _____7_____
Trip blank No.: _____-_____
Field blank No.: _____FA40755-5_____
Equipment blank No.:_____-_____
Field duplicate No.:_____FA40755-2/FA40755-3_____

___X___ Data Completeness	___X___ Laboratory Control Spikes
___X___ Holding Times	___X___ Field Duplicates
___X___ GC/MS Tuning	___X___ Calibrations
___X___ Internal Standard Performance	___X___ Compound Identifications
___X___ Blanks	___X___ Compound Quantitation
___X___ Surrogate Recoveries	___X___ Quantitation Limits
___X___ Matrix Spike/Matrix Spike Duplicate	

_OverallComments:___VOA_special_ist_(SW846_8260C).____
_____

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer:_____
Date:___February_17,_2017_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

All criteria were met __X__
Criteria were not met
and/or see below _____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within method recommended holding. Samples properly preserved.				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4$\pm$ 2°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 14 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): 3.5° C - OK

Actions

Aqueous samples

a. If there is no evidence that the samples were properly preserved (pH < 2, T = 4°C ± 2°C), but the samples were analyzed within the technical holding time [7 days from sample collection], no qualification of the data is necessary.
b. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [7 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
c. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).
e. If air bubbles were present in the sample vial used for analysis, qualify detected compounds as estimated (J-) and non-detected compounds as estimated (UJ).

Non-aqueous samples

a. If there is no evidence that the samples were properly preserved (T < -7°C or T = 4°C ± 2°C and preserved with $NaHSO_4$), but the samples were analyzed within the technical holding time [14 days

from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as (UJ) or unusable (R) using professional judgment.

b. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.

c. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [14 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).

d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).

Qualify TCLP/SPLP samples

a. If the TCLP/SPLP ZHE procedure is performed within the extraction technical holding time of 14 days, detects and non-detects should not be qualified.

b. If the TCLP/SPLP ZHE procedure is performed outside the extraction technical holding time of 14 days, qualify detects as estimated (J) and non-detects as unusable (R).

c. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed within the technical holding time of 7 days, detects and non-detects should not be qualified.

d. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed outside of the technical holding time of 7 days, qualify detects as estimated (J) and non-detects as unusable (R).

Table 1. Holding Time Actions for Low/Medium Volatile Analyses - Summary

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days	No qualification	
	No	> 7 days	J	R
	Yes	≤ 14 days	No qualification	
	Yes	> 14 days	J	R
Non-Aqueous	No	≤ 14 days	J	Professional judgment, UJ or R
	Yes	≤ 14 days	No qualification	
	Yes/No	> 14 days	J	R
TCLP/SPLP	Yes	≤ 14 days	No qualification	
TCLP/SPLP	No	> 14 days	J	R
TCLP/SPLP	ZHE performed within the 14-day technical holding time		No qualification	
TCLP/SPLP	ZHE performed outside the 14-day technical holding time		J	R
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed within 7 days		No qualification	
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed outside 7 days		J	R
Sample temperature outside 4°C ± 2°C upon receipt at the laboratory			Use professional judgment	
Holding times grossly exceeded			J	R

All criteria were met __X__
Criteria were not met see below _____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X___ The BFB performance results were reviewed and found to be within the specified criteria.

__X___ BFB tuning was performed for every 12 hours of sample analysis.

NOTES: All mass spectrometer instrument conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the method specifications are contrary to the Quality Assurance (QA) objectives, and are therefore unacceptable.

NOTES: No data should be qualified based on BFB failure. Instances of this should be noted in the narrative.

All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

Actions:

If samples are analyzed without a preceding valid instrument performance check, qualify all data in those samples as unusable (R).

If ion abundance criteria are not met, professional judgment may be applied to determine to what extent the data may be utilized. When applying professional judgment to this topic, the most important factors to consider are the empirical results that are relatively insensitive to location on the chromatographic profile and the type of instrumentation. Therefore, the critical ion abundance criteria for BFB are the m/z 95/96, 174/175, 174/176, and 176/177 ratios. The relative abundances of m/z 50 and 75 are of lower importance. This issue is more critical for Tentatively Identified Compounds (TICs) than for target analytes.

Note: State in the Data Review Narrative, decisions to use analytical data associated with BFB instrument performance checks not meeting contract requirements.

Note: Verify that that instrument instrument performance check criteria were achieved using techniques described in Low/Medium Volatiles Organic Analysis, Section II.D.5 of the SOM02.2 NFG, obtain additional information on the instrument performance checks. Make sure that background subtraction was performed from the BFB peak and not from background subtracting from the solvent front or from another region of the chromatogram.

Use professional judgment to determine whether associated data should be qualified based on the spectrum of the mass calibration compound.

List the samples affected:

If mass calibration is in error, all associated data are rejected.

All criteria were met _____
Criteria were not met
and/or see below ___X___

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 02/06/17	01/27/17
Dates of continuing (initial) calibration: 02/06/17	01/27/17
Dates of continuing calibration: 02/08/17	01/30/17
Dates of ending calibration: 02/06/17; 01/08/17	01/27/17; 01/30/17
Instrument ID numbers: GCMS1A	GCMSY
Matrix/Level: Aqueous/low	Aqueous/low

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
GCMS1A				
02/08/17	CC114-5	-36.8	1,4-Dioxane	FA40755-5

Note: Initial calibration, initial calibration verification, and continuing calibration verification within the method and validation guidance document required performance criteria except for the cases described in this document. Closing calibration check verification included in data package.

Results for 1,4-Dioxane qualified as estimated (J or UJ) in sample FA40755-5.

Criteria

The analyte calibration criteria in the following Table must be obtained. Analytes not meeting the criteria are qualified.

A separate worksheet should be filled for each initial curve.

Initial Calibration - Table 2. RRF, %RSD, and %D Acceptance Criteria for Initial Calibration and CCV for Low/Medium Volatile Analysis

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Closing Maximum %D
Dichlorodifluoromethane	0.010	25.0	±40.0	±50.0
Chloromethane	0.010	20.0	±30.0	±50.0
Vinyl chloride	0.010	20.0	±25.0	±50.0
Bromomethane	0.010	40.0	±30.0	±50.0
Chloroethane	0.010	40.0	±25.0	±50.0
Trichlorofluoromethane	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene	0.060	20.0	±20.0	±25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	25.0	±25.0	±50.0
Acetone	0.010	40.0	±40.0	±50.0
Carbon disulfide	0.100	20.0	±25.0	±25.0
Methyl acetate	0.010	40.0	±40.0	±50.0
Methylene chloride	0.010	40.0	±30.0	±50.0
trans-1,2-Dichloroethene	0.100	20.0	±20.0	±25.0
Methyl tert-butyl ether	0.100	40.0	±25.0	±50.0
1,1-Dichloroethane	0.300	20.0	±20.0	±25.0
cis-1,2-Dichloroethene	0.200	20.0	±20.0	±25.0
2-Butanone	0.010	40.0	±40.0	±50.0
Bromochloromethane	0.100	20.0	±20.0	±25.0
Chloroform	0.300	20.0	±20.0	±25.0
1,1,1-Trichloroethane	0.050	20.0	±25.0	±25.0
Cyclohexane	0.010	40.0	±25.0	±50.0
Carbon tetrachloride	0.100	20.0	±25.0	±25.0
Benzene	0.200	20.0	±20.0	±25.0
1,2-Dichloroethane	0.070	20.0	±20.0	±25.0
Trichloroethene	0.200	20.0	±20.0	±25.0
Methylcyclohexane	0.050	40.0	±25.0	±50.0
1,2-Dichloropropane	0.200	20.0	±20.0	±25.0
Bromodichloromethane	0.300	20.0	±20.0	±25.0
cis-1,3-Dichloropropene	0.300	20.0	±20.0	±25.0
4-Methyl-2-pentanone	0.030	25.0	±30.0	±50.0
Toluene	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene	0.200	20.0	±20.0	±25.0
1,1,2-Trichloroethane	0.200	20.0	±20.0	±25.0
Tetrachloroethene	0.100	20.0	±20.0	±25.0
2-Hexanone	0.010	40.0	±40.0	±50.0
Dibromochloromethane	0.200	20.0	±20.0	±25.0
1,2-Dibromoethane	0.200	20.0	±20.0	±25.0
Chlorobenzene	0.400	20.0	±20.0	±25.0
Ethylbenzene	0.400	20.0	±20.0	±25.0

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Closing Maximum
m,p-Xylene	0.200	20.0	±20.0	±25.0
o-Xylene	0.200	20.0	±20.0	±25.0
Styrene	0.200	20.0	±20.0	±25.0
Bromoform	0.100	20.0	±25.0	±50.0
Isopropylbenzene	0.400	20.0	±25.0	±25.0
1,1,2,2-Tetrachloroethane	0.200	20.0	±25.0	±25.0
1,3-Dichlorobenzene	0.500	20.0	±20.0	±25.0
1,4-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dibromo-3-chloropropane	0.010	25.0	±30.0	±50.0
1,2,4-Trichlorobenzene	0.400	20.0	±30.0	±50.0
1.2,3-Trichlorobenzene	0.400	25.0	±30.0	±50.0
Deuterated Monitoring Compound				
Vinyl chloride-d_3	0.010	20.0	±30.0	±50.0
Chloroethane-d_5	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene-d_2	0.050	20.0	±25.0	±25.0
2-Butanone-d_5	0.010	40.0	±40.0	±50.0
Chloroform-d	0.300	20.0	±20.0	±25.0
1,2-Dichloroethane-d_4	0.060	20.0	±25.0	±25.0
Benzene-d_6	0.300	20.0	±20.0	±25.0
1,2-Dichloropropane-d_6	0.200	20.0	±20.0	±25.0
Toluene-d_8	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene-d_4	0.200	20.0	±20.0	±25.0
2-Hexanone-d_5	0.010	40.0	±40.0	±50.0
1,1,2,2-Tetrachloroethane-d_2	0.200	20.0	±25.0	±25.0
1,2-Dichlorobenzene-d_4	0.400	20.0	±20.0	±25.0

[1] If a closing CCV is acting as an opening CCV, all target analytes and DMCs must meet the requirements for an opening CCV.

Actions:

1. If any volatile target compound has an RRF value less than the minimum in the table, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J+ or R).
   a. If any volatile target compound has an RRF value less than the minimum criterion, qualify non-detected compounds as unusable (R).
   b. If any of the volatile target compounds listed in the Table has %RSD greater than the criteria, qualify detects as estimated (J), and non-detected compounds using professional judgment.
   c. If the volatile target compounds meet the acceptance criteria for RRF and the %RSD, no qualification of the data is necessary.

d. No qualification of the data is necessary on the DMC RRF and %RSD data alone. Use professional judgment and follow the guidelines in Action 2 to evaluate the DMC RRF and %RSD data in conjunction with the DMC recoveries to determine the need for qualification of data.

2. At the reviewer's discretion, and based on the project-specific Data Quality Objectives (DQOs), a more in-depth review may be considered using the following guidelines:

a. If any volatile target compound has a %RSD greater than the maximum criterion in the Table, and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:

i. Qualify detects for that compound(s) as estimated (J).

ii. Qualify non-detected volatile target compounds using professional judgment.

b. If the high-point of the curve is outside of the linearity criteria (e.g., due to saturation):

i. Qualify detects outside of the linear portion of the curve as estimated (J).

ii. No qualifiers are required for detects in the linear portion of the curve.

iii. No qualifiers are required for volatile target compounds that were not detected.

c. If the low-point of the curve is outside of the linearity criteria:

i. Qualify low-level detects in the area of non-linearity as estimated (J).

ii. No qualifiers are required for detects in the linear portion of the curve.

iii. For non-detected volatile compounds, use the lowest point of the linear portion of the curve to determine the new quantitation limit.

Note: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for the Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Initial Calibration Actions for Low/Medium Volatile Analysis – Summary

Criteria	Action	
	Detect	Non-detect
Initial Calibration not performed at specified frequency and sequence	Use professional judgment R	Use professional judgment R
Initial Calibration not performed at the specified concentrations	J	UJ
RRF < Minimum RRF in Table for target analyte	Use professional judgment J+ or R	R
RRF > Minimum RRF in Table for target analyte	No qualification	No qualification
%RSD > Maximum %RSD in Table for target analyte	J	Use professional judgment
%RSD ≤ Maximum %RSD in Table for target analyte	No qualification	No qualification

All criteria were met_____
Criteria were not met
and/or see below ____X____

Continuing Calibration Verification (CCV)

NOTE: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analytical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see criteria show before in the Table) . If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

All DMCs must meet RRF criteria. No qualification of the data is necessary on the DMCs RRF and %RSD/%D data alone. However, use professional judgment to evaluate the DMC and %RSD/%D data in conjunction with the DMC recoveries to determine the need of qualification the data.

Action:

1. If a CCV (opening and closing) was not run at the appropriate frequency, qualify data using professional judgment.

2. Qualify all volatile target compounds in Table shown before using the following criteria:

   a. For an opening CCV, if any volatile target compound has an RRF value less than the minimum criterion, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J) and qualify non-detected compounds as unusable (R).
   b. For a closing CCV, if any volatile target compound has an RRF value less than the criteria, use professional judgment for detects based on mass spectral identification to qualify the data as estimated (J), and qualify non-detected compounds as unusable (R).
   c. For an opening CCV, if the Percent Difference value for any of the volatile target compounds is outside the limits in calibration criteria Table shown before, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
   d. For a closing CCV, if the Percent Difference value for any volatile target compound is outside the limits in calibration criteria table, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
   e. If the volatile target compounds meet the acceptable criteria for RRF and the Percent Difference, no qualification of the data is necessary.

f. No qualification of the data is necessary on the DMC RRF and the Percent Difference data alone. Use professional judgment to evaluate the DMC RRF and Percent Difference data in conjunction with the DMC recoveries to determine the need for qualification of data.

Notes: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for Contract Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Continuing Calibration Actions for Low/Medium Volatile Analysis – Summary

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detect	Non-detect
CCV not performed at required frequency	CCV not performed at required frequency	Use professional judgment R	Use professional judgment R
CCV not performed at specified concentration	CCV not performed at specified concentration	Use professional judgment	Use professional judgment
RRF < Minimum RRF in Table 2 for target analyte	RRF < Minimum RRF in Table for target analyte	Use professional judgment J or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	RRF ≥ Minimum RRF in Table for target analyte	No qualification	No qualification
%D outside the Opening Maximum %D limits in Table 2 for target analyte	%D outside the Closing Maximum %D limits in Table for target analyte	J	UJ
%D within the inclusive Opening Maximum %D limits in Table 2 for target analyte	%D within the inclusive Closing Maximum %D limits in Table for target analyte	No qualification	No qualification

All criteria were met _____
Criteria were not met
and/or see below ___X___

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

The concentration of a target analyte in any blank must not exceed its Contract Required Quantitation Limit (CRQL) (2x CRQLs for Methylene chloride, Acetone, and 2-Butanone). TIC concentration in any blanks must be ≤ 5.0 µg/L for water (0.0050 mg/L for TCLP leachate) and ≤ 5.0 µg/kg for soil matrices.

Laboratory blanks

The method blank, like any other sample in the SDG, must meet the technical acceptance criteria for sample analysis.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analyte detected in method blanks except for the cases described in this document.				
01/30/17	VY1327-MB	So/low	Methylene chloride	5.5 ug/kg

Note: No action taken, professional judgment. Methylene chloride is a common laboratory contaminant and was detected below the reporting limit.

Field/Equipment/Trip blank

If field or trip blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analyte detected in the field blank. No trip/equipment blanks analyzed associated with this data package.				

Note:

All criteria were met __X___
Criteria were not met
and/or see below _____

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Note: All fields blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks and trip blanks must be qualified for system monitoring compounds, instrument performance criteria, and spectral or calibration QC problems.

Samples taken from a drinking water tap do not have associated field blanks.

When applied as described in the Table below, the contaminant concentration in the blank is multiplied by the sample dilution factor.

Table. Blank and TCLP/SPLP LEB Actions for Low/Medium Volatile Analysis

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Storage, Field, Trip, TCLP/SPLP LEB, Instrument**	Detects	Not detected	No qualification required
	< CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL*	No qualification required
	> CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL* and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL* and > blank concentration	No qualification required
	= CRQL*	≤ CRQL*	Report CRQL value with a U
		> CRQL*	No qualification required
	Gross contamination	Detects	Report blank value for sample concentration with a U

* 2x the CRQL for methylene chloride, 2-butanone and acetone.
** Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 µg/L.

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

All criteria were met _____
Criteria were not met
and/or see below ____X___

DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike (DMCs) recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

Table. Volatile Deuterated Monitoring Compounds (DMCs) and Recovery Limits

DMC	%R for Water Sample	%R for Soil Sample
Vinyl chloride-d3	60-135	30-150
Chloroethane-d5	70-130	30-150
1,1-Dichloroethene-d2	60-125	45-110
2-Butanone-d5	40-130	20-135
Chloroform-d	70-125	40-150
1,2-Dichloroethane-d4	70-125	70-130
Benzene-d6	70-125	20-135
1,2-Dichloropropane-d6	70-120	70-120
Toluene-d8	80-120	30-130
trans-1,3-Dichloropropene-d4	60-125	30-135
2-Hexanone-d5	45-130	20-135
1,1,2,2-Tetrachloroethane-d2	65-120	45-120
1,2-Dichlorobenzene-d4	80-120	75-120

NOTE: The recovery limits for any of the compounds listed in the above Table may be expanded at any time during the period of performance if the United States Environmental Protection Agency (EPA) determines that the limits are too restrictive.

Action:

Are recoveries for DMCs in volatile samples and blanks must be within the limits specified in the Table above. **Yes**? or No?

NOTE: The recovery limits for any of the compounds listed in the Table above may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

List the DMCs that may fail to meet the recovery limits

Sample ID	Date	DMCs	% Recovery	Action
_FA40755-3	01/30/17	Toluene-d8	131_%	No_action
_FA40755-3	01/30/17	4-Bromofluorobenzene	139_%	No_action
_FA40755-4	01/30/17	4-Bromofluorobenzene	139_%	No_action

Note: DMCs recoveries within the laboratory required control limits and within the guidance document performance criteria (80 – 120) except for the cases described in this document. Other non-deuterated surrogates added to the samples within laboratory control limits recovered within laboratory control limits except for the cases described in this document.

No action taken, professional judgment. Outside control limits due to matrix interferences, confirmation run performed.

Note: Any sample which has more than 3 DMCs outside the limits must be reanalyzed.

Action:

1. For any recovery greater than the upper acceptance limit:
   a. Qualify detected associated volatile target compounds as estimated high (J+).
   b. Do not qualify non-detected associated volatile target compounds.
2. For any recovery greater than or equal to 10%, and less than the lower acceptance limit:
   a. Qualify detected associated volatile target compounds as estimated low (J-).
   b. Qualify non-detected associated volatile target compounds as estimated (UJ).
3. For any recovery less than 10%:
   a. Qualify detected associated volatile target compounds as estimated low (J-).
   b. Qualify non-detected associated volatile target compounds as unusable (R).
4. For any recovery within acceptance limits, no qualification of the data is necessary.
5. In the special case of a blank analysis having DMCs out of specification, the reviewer must give special consideration to the validity of associated sample data. The basic concern is whether the blank problems represent an isolated problem with the blank alone, or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence. However, even if this judgment allows some use of the affected data, note analytical problems for Contract Laboratory COR action.
6. If more than three DMCs are outside of the recovery limits for Low/Medium volatiles analysis and the sample was not reanalyzed, note under Contract Problems/Non-Compliance.

Table. Deuterated Monitoring Compound (DMC) Recovery Actions for Low/Medium Volatiles Analyses – Summary

Criteria	Action	
	Detect Associated Compounds	Non-detected Associated Compounds
%R < 10%	J-	R
10% ≤ %R < Lower Acceptance Limit	J-	UJ
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

TABLE. VOLATILE DEUTERATED MONITORING COMPOUNDS (DMCs) AND THE ASSOCIATED TARGET COMPOUNDS

Vinyl chloride-d_3 (DMC-1)	**Chloroethane-d_5 (DMC-2)**	**1,1-Dichloroethene-d_2 (DMC-3)**
Vinyl chloride	Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon disulfide	trans-1,2-Dichloroethene cis-1,2-Dichloroethene 1,1-Dichloroethene
2-Butanone-d_5 (DMC-4)	**Chloroform-d (DMC-5)**	**1,2-Dichloroethane-d_4 (DMC-6)**
Acetone 2-Butanone	1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl acetate Methylene chloride Methyl-tert-butyl ether 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dibromoethane 1,2-Dichloroethane
Benzene-d_6 (DMC-7)	**1,2-Dichloropropane-d_6 (DMC-8)**	**Toluene-d_8 (DMC-9)**
Benzene	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylene m,p-Xylene Styrene Isopropylbenzene
trans-1,3-Dichloropropene-d_4 (DMC-10)	**2-Hexanone-d_5 (DMC-11)**	**1,1,2,2-Tetrachloroethane-d_2 (DMC-12)**
cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	4-Methyl-2-pentanone 2-Hexanone	1,1,2,2,-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene-d_4 (DMC-13)		
Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene		

All criteria were met _____
Criteria were not met
and/or see below ____X____

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

NOTES: Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID:_ FA40755-4MS/4MSD____ Matrix/Level:_____Soil_____
Sample ID:_ FA40969-1MS/1MSD____ Matrix/Level:__Aqueous_____

The QC reported here applies to the following samples: Method: **SW846 8260C**
FA40755-1, FA40755-2, FA40755-3, FA40755-4

Compound	FA40755-4 ug/l	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
Benzyl Chloride	ND		67.6	30.4	45*	60.3	29.8	49*	2	65-126/31
n-Butylbenzene	ND		67.6	40.2	59*	60.3	35.6	59*	12	71-128/35
sec-Butylbenzene	ND		67.6	48.9	72*	60.3	44.0	73*	11	79-135/34
Cyclohexane	ND		67.6	33.3	49*	60.3	36.3	60*	9	73-126/32
1,2-Dichlorobenzene	ND		67.6	48.5	72*	60.3	46.9	78*	3	80-129/32
1,3-Dichlorobenzene	ND		67.6	51.6	76*	60.3	49.0	81	5	81-129/33
cis-1,2-Dichloroethylene	ND		67.6	48.3	71*	60.3	60.8	101	23	74-126/26
cis-1,3-Dichloropropene	ND		67.6	45.3	67*	60.3	49.5	82	9	80-123/26
1,4-Dioxane	ND		1350	1800	133	1210	1190	99	41*	56-152/37
Isopropylbenzene	ND		67.6	57.4	85	60.3	45.9	76*	22	80-136/32
Methyl Acetate	ND		338	188	56*	301	138	46*	31*	67-137/30
Methylcyclohexane	ND		67.6	29.6	44*	60.3	28.0	46*	6	75-128/31
Styrene	ND		67.6	56.2	83	60.3	46.6	77*	19	78-125/30

The QC reported here applies to the following samples: Method: **SW846 8260C**
FA40755-1, FA40755-2, FA40755-3, FA40755-4

Compound	FA40755-4 ug/l	Q	Spike ug/lkg	MS ug/kg	MS %	Spike ug/kg	MSD ug/l	MSD %	RPD	Limits Rec/RPD
Tert-Butyl Alcohol	ND		676	998	148*	603	715	119	33*	74-126/32
Tetrahydrofuran	ND		67.6	24.9	37*	60.3	22.1	37*	12	70-133/26
1,2,3-Trichlorobenzene	ND		67.6	20.2	30*	60.3	20.6	34*	2	77-128/35
1,2,4-Trichlorobenzene	ND		67.6	25.3	37*	60.3	24.3	40*	4	78-130/34
Vinyl Chloride	ND		67.6	50.6	75*	60.3	51.2	85	1	76-141/27

* = Outside of Control Limits.

Note: MS/MSD % recoveries and RPD within laboratory control limits except in the cases described in this document. Anlytes not meeting the MS/MSD % recovery criteria were qualified as estimated (J or UJ) in sample FA40755-4.

Analytes not meeting either the MS or MSD % recovery criteria are not qualified, professional judgment. % recovery criteria within generally acceptable laboratory control limits.

No qualification made based on RPD results. Professional judgment.

The QC reported here applies to the following samples: Method: **SW846 8260C**
FA40755-5

Compound	FA40969-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
cis-1,3-Dichloropropene	ND		25	20.0	80	25	18.3	73*	9	75-118/23
Styrene	ND		25	22.2	89	25	18.2	73*	20	78-119/23
Tetrahydrofuran	ND		25	31.0	124*	25	32.3	129*	4	56-122/21

Note: No action taken, MS/MSD % recovery results apply to the unspiked sample. Unspiked sample from another job.

Note:

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

1. No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met __X___
Criteria were not met
and/or see below _____

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? **Yes** or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID COMPOUND % R QC LIMIT

Recoveries(blank_spike)_within_laboratory_control_limits_for_each_matrix_type._____
_____
_____
_____
_____

Note:

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met ___X___
Criteria were not met
and/or see below _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs: __FA40755-2/FA40755-3_____ Matrix:___Soil___

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

> **NOTE:** In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. Use professional judgment to note large RPDs (> 50%) in the narrative.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Field duplicate analyzed with this data package. RPD within required criteria, ≤ 50 % for target analytes detected at concentration > 5x the SQL.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions are suggested based on professional judgment:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met _____
Criteria were not met
and/or see below ____X___

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION
01/30/17	FA40755-1	1,4-Dichlorobenzene-d4	211445	228968 – 915872	No action
01/30/17	FA40755-3	1,4-Dichlorobenzene-d4	185036	228968 – 915872	No action
01/30/17	FA40755-4	1,4-Dichlorobenzene-d4	182488	228968 – 915872	No action
01/30/17	FA40755-1^	1,4-Dichlorobenzene-d4	212149	228968 – 915872	No action
01/30/17	FA40755-3*	1,4-Dichlorobenzene-d4	200663	228968 – 915872	No action
01/30/17	FA40755-3*	Tert-Butyl Alcohol-d10	68177	100519 – 402074	No action
01/30/17	FA40755-3^	1,4-Dichlorobenzene-d4	173614	228968 – 915872	No action
01/30/17	FA40755-3^	Tert-Butyl Alcohol-d10	97547	100519 – 402074	No action

Internal standard area within laboratory control limits except for the cases described in this document.

^ - Confirmation run for internal standard areas.
* - Confirmation run for surrogate recoveries.

Note: No action taken, professional judgment. Internal area outside laboratory control limits due to matrix interferences, confirmed by re-analysis.

Action:

1. If an internal standard area count for a sample or blank is greater than 200.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table below):
   a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
   b. Do not qualify non-detected associated compounds.
2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):

a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).

b. Qualify non-detected associated compounds as unusable (R).

3. If an internal standard area count for a sample or blank is greater than or equal to 20.0%, and less than or equal to 200% of the area for the associated standard opening CCV or mid-point standard from initial calibration, no qualification of the data is necessary.

4. If an internal standard RT varies by more than 30.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

5. If an internal standard RT varies by less than or equal to 30.0 seconds, no qualification of the data is necessary.

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

6. If required internal standard compounds are not added to a sample or blank, qualify detects and non-detects as unusable (R).

7. If the required internal standard compound is not analyzed at the specified concentration in a sample or blank, use professional judgment to qualify detects and non-detects.

Table. Internal Standard Actions for Low/Medium Volatiles Analyses - Summary

Criteria	Action	
	Detected Associated Compounds*	Non-detected Associated Compounds*
Area counts > 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J-	No qualification
Area counts < 20% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J+	R
Area counts ≥ 50% but ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	
RT difference > 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	R **	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	

* For volatile compounds associated to each internal standard, see TABLE - VOLATILE TARGET ANALYTES, DEUTERATED MONITORING COMPOUNDS WITH ASSOCIATED INTERNAL STANDARDS FOR QUANTITATION in SOM02.2, Exhibit D, available at: http://www.epa.gov/superfund/programs/clp/download/som/som22d.pdf

** Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

All criteria were met __X__
Criteria were not met
and/or see below _____

TARGET COMPOUND IDENTIFICATION

Criteria:

Is the Relative Retention Times (RRTs) of reported compounds within ±0.06 RRT units of the standard RRT [opening Continuing Calibration Verification (CCV) or mid-point standard from the initial calibration]. **Yes**? or No?

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions

Mass spectra of the sample compound and a current laboratory-generated standard [i.e., the mass spectrum from the associated calibration standard (opening CCV or mid-point standard from initial calibration)] must match according to the following criteria:

a. All ions present in the standard mass spectrum at a relative intensity greater than 10% must be present in the sample spectrum.
b. The relative intensities of these ions must agree within ±20% between the standard and sample spectra (e.g., for an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30-70%).
c. Ions present at greater than 10% in the sample mass spectrum, but not present in the standard spectrum, must be evaluated by a reviewer experienced in mass spectral interpretation.

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions

Action:

1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).

2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.

3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

List TICs

Sample ID	Compound	Sample ID	Compound

Action:

1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
2. General actions related to the review of TIC results are as follows:
   a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
   b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
3. In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene

isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).

4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).
5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

All criteria were met __X__
Criteria were not met
and/or see below _____

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

1. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
2. For non-aqueous samples, in the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table below).
3. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
4. Results between MDL and CRQL should be qualified as estimated "J".
5. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves are not reported.

Table. Percent Moisture Actions for Low/Medium Volatiles Analysis for Non-Aqueous Samples

Criteria	Action	
	Detected Associated Compounds	**Non-detected Associated Compounds**
% Moisture < 70.0	No qualification	
70.0 < % Moisture < 90.0	J	UJ
% Moisture > 90.0	J	R

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

Sample ID

FA40755-4MS Acetone RF = 0.087

[ ] = (340617)(50)/(0.087)(1034165) = 189.3 ppb Ok

All criteria were met __X__
Criteria were not met
and/or see below _____

B. Percent Solids

List samples which have ≥ 70 % solids

_____
_____
_____
_____
_____
_____

QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

All criteria were met __X__
Criteria were not met
and/or see below _____

OTHER ISSUES

A. System Performance

List samples qualified based on the degradation of system performance during simple analysis:

Sample ID	Comments	Actions
_____	_____	_____
_No_degradation_of_system_performance_observed.		_____
_____	_____	_____
_____	_____	_____

Action:

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Inform the Contract Laboratory Program COR any action as a result of degradation of system performance which significantly affected the data.

B. Overall Assessment of Data

List samples qualified based on other issues:

Sample ID	Comments	Actions
_____	_____	_____
_No_additional_issues_observed_that_require_qualification_of_the_data._Results_are_valid_and_ _can_be_used_for_decission_purposes._____		_____
_____	_____	_____
_____	_____	_____

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).